Food and Agriculture Organization of the United Nations

Halting deforestation from agricultural value chains: **the role of governments**

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Halting deforestation from agricultural value chains: **the role of governments**

by **Kristin DeValue**
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Food and Agriculture Organization of the United Nations
Rome, 2022

REQUIRED CITATION:

DeValue, K., Takahashi, N., Woolnough, T., Merle, C., Fortuna S. and Agostini, A. 2022. *Halting deforestation from agricultural value chains: the role of governments*. Rome, FAO. https://doi.org/10.4060/cc2262en

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ISBN 978-92-5-136949-4

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Acknowledgements

This paper was authored by Kristin DeValue, Naoko Takahashi, Thomas Woolnough, Caroline Merle, Serena Fortuna and Astrid Agostini. It is a joint effort between the REDD+ team of the Food and Agriculture Organization of the United Nations (FAO), various units in the Forestry Division (NFO) and other FAO divisions, with special thanks to the Plant Production and Protection Division (NSP). It represents the culmination of collaboration with experts from within FAO, and other organizations as well as national practitioners, all of whom very generously dedicated their time to review the draft text and provide insightful comments and guidance.

Great thanks are due to the following FAO colleagues (in alphabetical order): Safia Aggrawal, Jorge Armijos, Jhongsathit Aungvitayatorn, Niclas Benni, Vera Boerger, Fritjof Boerstler, Erica Carvell, Rocio Condor, Rémi d'Annunzio, Etienne Drieux, Amy Duchelle, Francesca Felicani Robles, José Carlos Fernandez Ugalde, Adam Gerrand, María Belén Herrera, Daphne Hewitt (now Tetra Tech), Adriana Ignaciuk, Akiko Inoguchi, Tomislav Ivančić, David Kaimowitz (now The Tenure Facility), Patrick Kalas, Siobhan Kelly, Adolfo Kindgard, Cléto Ndikumagenge, Till Neeff, David Neven, Maria Nuutinen, Priya Pajel, Marggiori Pancorbo Olivera, Angel Parra Aguiar, Erica Pohnan, Carla Rodriguez, Francesca Romano, Maricarmen Ruiz-Jaén, Serge Sabi Oleko, Marieke Sandker, Lucio Santos, Elaine Springgay, Minoarivelo Randrianarison, Simon Rietbergen, Tiina Vahanen and Laura Villegas, with special thanks to Fenton Beed, Makiko Taguchi and Bruno Telemans for the expertise and insight brought in on agriculture production aspects.

The authors express their most sincere gratitude to the following external reviewers who generously dedicated their time and expertise to enrich this paper: Yoann Allanic (United Nations Environment Programme - UNEP), Pascale Bonzom (United Nations Development Programme - UNDP), Katie McCoshan (Food and Land Use Coalition - FOLU), Pablo Pacheco (World Wildlife Fund - WWF), Franziska Rau (Deutsche Gesellschaft für Internationale Zusammenarbeit - GIZ), Sara Scherr (EcoAgriculture Partners) and Peter Umunay (UNEP).

Lastly, the authors acknowledge Jalal El Halabi for copy editing and Lorenzo Catena for layout and design.

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Abbreviations and acronyms

AFi	Accountability Framework Initiative
AFOLU	agriculture, forestry and other land use
BC3	Basque Centre for Climate Change
CAFI	Central African Forest Initiative
CGF	Consumer Goods Forum
CoP	Conference of the Parties
ESG	environmental, social and governance
FACT	Forest, Agriculture and Commodity Trade
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FLEGT	Forest Law Enforcement, Governance, and Trade
FPIC	free, prior and informed consent
FRA	Global Forest Resources Assessment
GCF	Green Climate Fund
GHG	greenhouse gas
GRSB	Global Roundtable for Sustainable Beef
ha	hectare
HCS	high carbon Stock
HCV	high conservation Value
ICCO	International Cocoa Organization
IPCC	Intergovernmental Panel on Climate Change
LDN	land degradation neutrality
MRV	monitoring, reporting, and verification
MSME	micro-, small and medium-sized enterprises
NDC	Nationally Determined Contribution
NFMS	national forest monitoring system
NYDF	New York Declaration on Forests
OECD	Organisation for Economic Co-operation and Development
PES	payments for ecosystem services/payments for environmental services
PRAP	provincial REDD+ action plan
PRI	principles for responsible investment
R&D	research and development
RBPs	results-based payments
REDD+	reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
RSPO	Roundtable on Sustainable Palm Oil
RTRS	Round Table on Responsible Soy Association
SDGs	Sustainable Development Goals
SEPAL	System for Earth Observation Data Access, Processing, and Analysis for Land Monitoring
SIS	safeguards information system
TFA	Tropical Forest Alliance
UNCCD	United Nations Convention to Combat Desertification
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
UNSPF	United Nations Strategic Plan for Forests 2030
WBCSD	World Business Council for Sustainable Development

Key messages

1. **Agriculture and forestry are closely linked. Decision-makers must address trade-offs and enhance mutually supportive interactions to meet climate goals and achieve food security, poverty alleviation and other sustainable development objectives.**

   Multiple linkages exist between agriculture and forestry, which together contribute to sustainable agrifood systems, sustainable development, food security and rural livelihoods: in many rural areas, farmers work in both agriculture and forestry, and forests and trees provide ecosystem services crucial to agriculture.

   Yet there are trade-offs, such as competition for land. Between 2000 and 2018, **almost 90 percent of deforestation globally was attributable to agricultural expansion,** negatively impacting associated ecosystem services such as carbon sequestration and biodiversity. Based on population growth and food demand projections, **up to 50 percent more food will need to be produced by 2050**, necessitating **165 to 600 million more ha of land for crop and livestock production** – much of which is currently covered by forests and other critical ecosystems.

   Yield increases alone would be insufficient to meet demand and must be paired with other interventions, including restoration of degraded land, forest protection and improved governance, **to ensure an increase in food security without drastically diminishing forest cover**.

   Systemic change is necessary to transform agrifood systems, enabling a greater production of food while simultaneously reducing land use change and thus, meeting sustainable development and climate objectives. In addition to halting deforestation efforts to meet the climate targets for staying within 1.5°C warming, **agricultural emissions must be reduced by two-thirds by 2050 compared to 2010 levels and at least 585 million ha of agricultural land reforested**. Complementary approaches to food production and forest conservation that benefit both forests and agrifood systems are possible and need to be upscaled. The national pathways for food systems transformation launched at the 2021 United Nations Food Systems Summit, together with national climate action, including REDD+, could represent important platforms for such actions.

2. **Public sector action is underway to decouple agricultural production from deforestation. However, better coordination across countries that produce and consume agricultural commodities associated with forest conversion is needed.**

   Momentum to achieve more sustainable agrifood systems and decouple agricultural production from deforestation has been increasing both in countries that primarily *consume* agricultural commodities associated with deforestation and forest degradation as well as in those that primarily *produce* them.

   While relevant multilateral commitments – notably the 2021 Glasgow Leaders" Declaration on Forests and Land Use, the Forest, Agriculture and Commodity Trade (FACT) Dialogue roadmap, and the Policy Action Agenda for the Transition to Sustainable Food and Agriculture – have engaged a range of countries, **initiatives across "consumer" and "producer" countries lack sufficient coordination and alignment to enhance impact and manage trade-offs** between agriculture and forests.

   "Consumer" countries are enhancing regulatory frameworks with due diligence measures and trade standards for agricultural goods to reduce deforestation embodied in imported products. "Producer" countries are implementing a range of strategies according to national circumstance, from land use planning to payments for ecosystem services. Climate action, through REDD+ implementation and the re-investment of associated result-based payments, as well as the integration of agriculture and forest sector interventions in Nationally Determined Contributions (NDCs), represent a critical avenue to progress.

3. **Private sector actors made early commitments to eliminate deforestation from supply chains, but implementation needs to be boosted.**

   Consumer goods retailers and manufacturers with a combined market value of USD 2 trillion and **financial institutions** managing nearly USD 9 trillion in assets **have pledged to eliminate deforestation from their supply chains and investment portfolios**, including through the 2014 New York Declaration on Forests, the Consumer Goods Forum's "Forest Positive" Coalition, individual company pledges and numerous joint commitments. Governments, non-governmental organizations (NGOs) and industry groups have contributed to an emergence of reporting requirements, best practices and guidance for private companies and financial institutions to invest in more sustainable agricultural and landscape management practices and address deforestation risks.

However, **commitments made by private sector actors to eliminate deforestation from supply chains by 2020 have not been met.** Challenges remain to operationalize these and address the business risk deforestation presents, valued at more than USD 79 billion. An enabling public sector environment, together with public-private-producer partnerships can help facilitate the achievement of such commitments going forward.

4. Governments are key to developing the enabling conditions across sectors and stakeholders for more sustainable agrifood systems, ensuring forest protection.

Public sector action is crucial to set the enabling conditions necessary to reduce deforestation and associated carbon emissions, and notably for removing deforestation from agricultural value chains. Such action can aim to **improve policy and regulatory coherence, better law enforcement and enhanced governance, critical dimensions of the reforms needed to achieve agrifood system transformation**. Governments can play a key role in **convening multistakeholder dialogues** that seek to develop a common vision and strategy to eliminate deforestation from agricultural commodity value chains. Attention to boost the engagement and participation of actors representing different sectors and scales, the engagement of producer organizations, Indigenous Peoples, local communities, civil society representatives, and private sector actors, would be critical. Full success in halting deforestation and implementation of national commitments will inevitably be influenced by external factors, inter alia, commodity price fluctuations, changing consumption patterns and trade regulations. Governments can identify actions, such as policy tools that lesson the impact for producers from such international factors, as part of their efforts to strengthen the enabling environment.

5. Ensuring and scaling up finance is critical to halting deforestation and enhancing synergies between agriculture and forestry

Governments must mobilize public and private finance from domestic and international sources to transform agrifood systems.

Among these efforts are targeted economic and financial assessments of how existing resources are used, adjusting budget allocations to **maximize impacts in reducing rural poverty or increasing agricultural production while avoiding perverse effects on forests.**

They can invest in public goods and services for the agriculture sector and fiscal subsidies decoupled from production for specific commodities. This can include **extension services and technical assistance to promote the uptake of more sustainable practices, promoting research and development** for innovative agricultural technologies favourable to forests, including those developed locally.

By catalysing and aligning public and private finance, governments can incentivize agricultural products with neutral or positive impact on forests. **Efforts to ensure a coherent and stable policy and legal environment, and to de-risk agricultural investment, are vital to attracting private investment to transform agricultural value chains and invest in integrated landscape management. Government capacity to monitor progress and ensure robust accountability are key to ensuring sufficient funding, which can include multilateral and bilateral cooperation or carbon-related finance. Climate finance, including REDD+ and related results-based payments, can help fund actions needed to reduce the impact of agriculture practices on forests, enhancing restoration and increasing sustainable use of forests.**

Better access of subnational jurisdictions to climate finance could accelerate local action. Clear and fair rules for benefit sharing will be a condition for maintaining stakeholder engagement in the efforts against deforestation and for more sustainable production models.

6. Integrated landscape approaches provide an opportunity to develop practical solutions grounded in local realities.

Agricultural production takes place in landscapes with particular social, economic and ecological contexts and finite natural resources, including the land itself. Integrated landscape approaches can provide an opportunity to develop and implement context-specific interventions to reduce deforestation from agriculture. **Notably, decentralized authorities are well positioned to catalyse approaches that meet multiple objectives of diverse stakeholders and support the effective implementation of national and international commitments on the ground.**

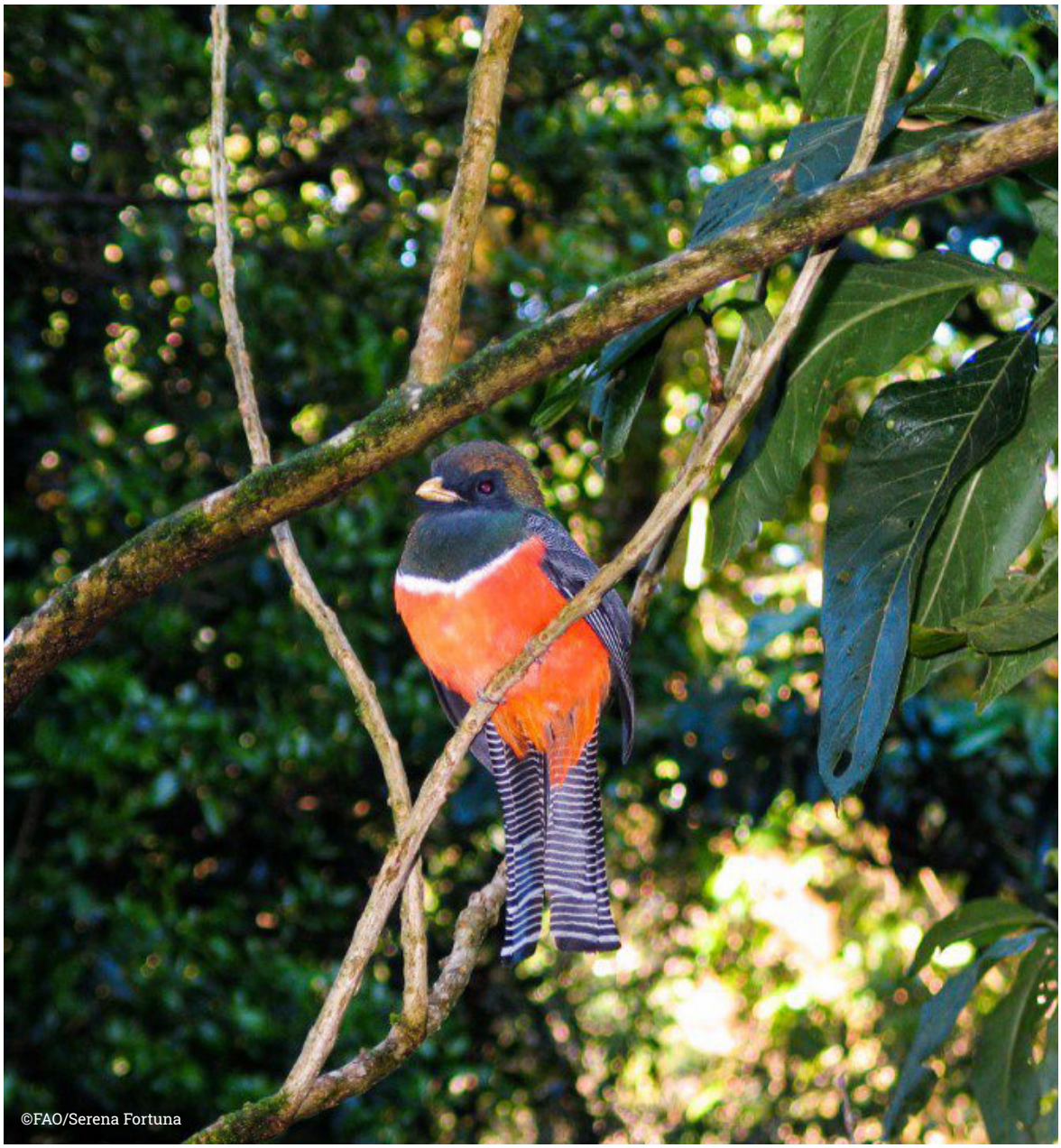
While adapting to local contexts, these approaches may include actions focused on agricultural production, protection of forests and other natural ecosystems, restoration of forests and degraded agricultural lands. They request strong institutional "vertical" (across local and national levels) and cross-sectoral "horizontal" collaboration within government (across government ministries and agencies) and across stakeholders, with active engagement of Indigenous Peoples, local communities, small-scale farmers, women and youth. Authorities' capacities to ensure processes are inclusive, adequately embedded in national policy frameworks and equipped with the continued technical support is essential if the process is to succeed. Landscape approaches may be coordinated with private sector supply chain initiatives for major commodities to ensure complementary and efficient action, thus addressing power imbalances.

7. Information is key in halting deforestation. Governments can facilitate the provision of open, transparent, and accessible agriculture and forest data to inform policymaking, law enforcement and land use planning.

Governments can make the difference by investing in the design and sustained implementation of forest, land use and agricultural monitoring systems enabling better policymaking. **Accessible, transparent, reliable, and credible data on forests and other land uses and sectors associated with deforestation are key for decision-making and monitoring progress**. These are needed for planning activities, risk assessment, investment decisions and accountability purposes by governments themselves, the private sector and civil society. For governments, transparency and reliability are prerequisites for accessing results-based finance, including for REDD+ results.

The **institutionalization of forest and land use monitoring frameworks and the allocation of national budgets for their continuation is critical to credibility and continuity.**

Better articulation between information on forests and information on other sectors and land uses, notably agriculture, could significantly increase the potential of monitoring systems to inform decision-making to reduce deforestation.



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Executive summary

Global agrifood systems and forests

Forests and trees critically contribute to sustainable agrifood systems, food security and nutrition, including through the mitigation of and adaptation to climate change. Agriculture and forestry are intrinsically linked: in many rural areas, farmers depend on both agriculture and forestry for income and subsistence. Support from forests to agriculture includes offering habitats for pollinators, water regulation, soil fertility and carbon sequestration.

Yet we have lost 420 million ha of forest through deforestation since 1990 and deforestation continues, although the rate has slowed from 11 million ha per year in the decade 2000–2010 to 8.8 million ha per year in the period 2010–2018. There are persistent trade-offs between agriculture and forests, with competition for land among the most notable; responsible for almost 90 percent of global deforestation between 2000 and 2018, agricultural expansion for cropland and livestock grazing is the largest driving force of forest loss.

Globally, population growth, consumption habits, shifting diets, food loss and waste, and increased affluence are among the many factors pushing the agriculture sector to produce more and different types of food. At the same time, land degradation and the consequences of climate change reduce the availability and productivity of arable land. In a "business-as-usual" scenario, these trends will continue leading to the conversion of forest land into agriculture, exacerbating a vicious cycle that will lead to catastrophic impacts on climate and biodiversity.

Based on population growth and food demand projections, food production will need to increase by up to 50 percent by 2050, requiring 165 to 600 million more ha of land for crop and livestock production, much of which is currently covered by forests and other critical ecosystems. Yield increases alone would be insufficient to meet demand and protect forests. The world cannot afford to continue losing vital biodiversity and forest resources. Therefore, yield improvements must be paired with other interventions that strengthen governance, protect forests and promote the achievement of economic, environmental and social sustainability. Thankfully, opportunities exist to develop complementary approaches to food production and forest conservation that benefit both forests and agrifood systems.

Increasing food security without drastically diminishing forest cover is a major challenge, calling for concerted and collective action. All forest and land-use actors, from local communities and Indigenous Peoples to governments, producers and the private sector must be mobilized. Governments play a critical role in halting deforestation and boosting forest restoration. The governments of countries where deforestation for agricultural production occurs and governments of countries indirectly driving land use change through consumption patterns have differing responsibilities and capacities to achieve much-needed agrifood systems transformation.

Global momentum and on-going actions

For more than a decade, multiple commitments and initiatives have boosted global momentum to halt deforestation. The Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+) process, as well as other multilateral commitments, unanimously recognize the link between forests and agriculture; some of the most recent include the 2014 New York Declaration on Forests (NYDF) and the 2021 Glasgow Leaders" Declaration on Forests and Land Use, endorsed by 144 governments, the Forest, Agriculture and Commodity Trade (FACT) Dialogue roadmap, and the Policy Action Agenda for the Transition to Sustainable Food and Agriculture.

Countries that produce raw agricultural commodities – and to some extent consume them (here called "producer countries") and countries that primarily consume these commodities or their derived products (here called "consumer countries") – have implemented actions to curve forest loss. "Consumer countries" have adopted a focus on value chains, seeking to reduce the risk of deforestation embedded in imports, first with voluntary approaches and increasingly through regulatory instruments. "Producer countries" in turn, have enacted reforms and policies adapted to national circumstances, developing an enabling environment, disincentivizing forest conversion and incentivizing good practice. In many countries, REDD+ has provided a major and concrete opportunity to convene the agriculture and forestry sectors around halting deforestation. Integrated landscape approaches were implemented in dozens of subnational jurisdictions to combine objectives from different sectoral policies, notably, economic development and forest protection. They often combine four main categories of action: produce, protect, restore and include.

Importantly, the private sector has acted through global and regional value chains. Companies are increasingly considering the risk of deforestation associated to their supplies in corporate policies. Disclosure of the related results is progressing, though more work is needed. Companies engage in multi-stakeholder initiatives together with public entities, producer organizations, NGOs and civil society, in particular for commodities like palm oil, cocoa or coffee. Sectoral standards and certification schemes have been used to encourage the adoption of improved practices throughout agricultural and forest product value chains, and many companies rely on certification to demonstrate compliance to their own sustainability objectives or to specific regulations. Increased availability and reliability of

data on forests have supported both private and public decision-making and interventions.

The role of government in decoupling agricultural production, markets and trade from deforestation

Deforestation generally results from complex interactions among global and local factors, calling for multi-dimensional responses. Despite the progress achieved in addressing deforestation to date, better coordination, strengthened alignment and knowledge-sharing must be facilitated among countries, and across stakeholders and economic sectors.

With specific responsibilities and mandates, governments are at the centre of the process. To stop - and reverse - negative dynamics of forest loss associated with agriculture, governments may act in several areas, such as: establishing an enabling environment, assessing coherence and enforcement of policies and regulatory frameworks, establishing monitoring capacities and access to reliable and transparent data, investing in capacity development and knowledge generation or direct support to more sustainable agricultural practices without negative impacts on forests ("forest positive agriculture'), and adopting measures and incentives to promote more sustainable production, markets and trade.

Establish an enabling environment and enforce legality

Halting deforestation without restricting progress towards other Sustainable Development Goals, such as ending hunger and reducing poverty, requires policy coherence and effective governance. Alignment of sectoral policies is a must for achieving goals that could otherwise appear as competing. Integrated strategies, like countries' national pathways for food systems transformation developed in the framework of the 2021 United Nations (UN) Food Systems Summit, offer an opportunity for stakeholders to agree upon a common vision and consistent set of objectives for land use and socio-economic development. REDD+ strategies, as well national climate commitments in Nationally Determined Contributions (NDCs) and Long Term Strategies (LTS), could serve as important platforms to convene multi-stakeholder actors.

Legal frameworks should reflect this coherence, avoiding discrepancies across sectors and levels of government. Strong institutional coordination is needed, both horizontally (between different national government ministries and agencies, and with broader stakeholder groups) and vertically (between national and sub-national levels and stakeholders including local actors and downstream companies).

Integrated land use planning, both at the national and subnational level, is key to realizing this coherence on the ground and ensuring forests are consistently considered in government planning across sectors. These processes must build upon multi-stakeholder collaboration, where governments can have a key convening role, paying special attention to ensure the active participation of Indigenous Peoples, local communities, women and youth.

Strengthening decentralized authorities can catalyse integrated landscape approaches that meet multiple objectives of diverse stakeholders, and support the effective implementation of national and international commitments on the ground. Law enforcement and the fight against corruption are other key components enabling investment in the transition to more sustainable land use practices and reduction of forest loss. Finally, strengthening tenure and resource rights, including for Indigenous Peoples, local communities and vulnerable groups, can foster sustainable use of land, forests and other resources. Secured rights can encourage public and private investment and the adoption of agricultural practices favourable to forests, including agroforestry.

Design and support forest, land use and agricultural monitoring systems that enable better policymaking

Governments are central to investments in the design and sustained implementation of forest, land use and agricultural monitoring systems enabling better policymaking. Accessible, transparent, reliable and credible data on forests and other land uses and sectors associated with deforestation are key for decision-making and monitoring progress; they are needed by governments themselves, the private sector and civil society for planning activities, conducting risk assessments, making investment decisions and ensuring accountability for actions that halt or cause deforestation. For governments, transparency and reliability are prerequisites for accessing results-based finance, including for REDD+ results. The institutionalization of forest and land use monitoring systems and the allocation of budgeting for their continuation is critical to credibility and continuity. Better articulation between information on forests and information on other sectors and land uses, notably agriculture, could significantly increase the potential of monitoring systems to inform decision-making to reduce deforestation.

Invest in capacity development and knowledge generation for producers

Enhancing capacities of producers and other actors along the value chains of agricultural commodities associated with deforestation is another strategic field of action for governments. Technical assistance and the delivery of extension services to farmers are vital for supporting the adoption of production models with positive impacts on forests and trees. Further investment in research and development for agricultural technologies and innovation is needed to design and expand adoption of production practices that sustainably increase productivity and nutritional quality of agriculture, while better integrating biodiversity and climate objectives. Increased knowledge exchanges and technological transfer among national actors and research institutions, including across "consumer countries" and "producer countries", can accelerate progress.

Adopt measures and incentives to develop and strengthen legal and sustainable agricultural value chains

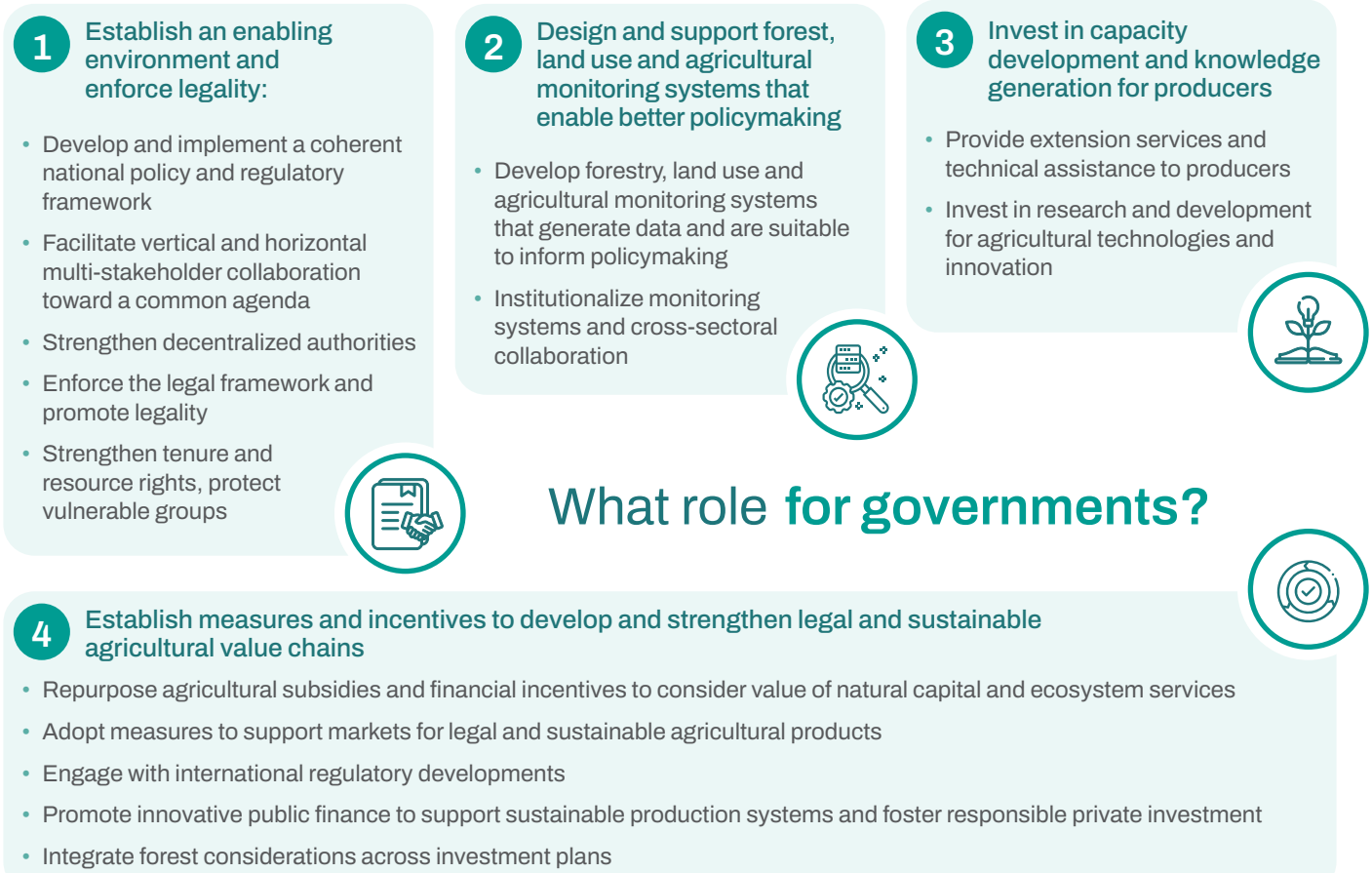
Addressing the competition for land between forests and agriculture requires governments to act at the level of agricultural value chains and associated markets. Globally, reforming agricultural subsidies and financial incentives is

vital to protecting forests and scaling up sustainable agriculture practices. Governments could contribute to halting deforestation by assessing and realigning the numerous financial and policy incentives that influence small- and large-scale producers, removing instruments that encourage agricultural expansion leading to forest conversion. Moreover, redirecting funds to invest in public goods and services for the agriculture sector and using fiscal subsidies decoupled from production of particular commodities could prove to be more socially and environmentally efficient means of supporting producers. Other levers that can support the adoption of sustainable production practices and the preservation of forest cover, depending on local and national circumstances and the actors to whom they are targeted, include implementing payments for ecosystem services, linking to REDD+ results-based payments (RBPs) and benefit distribution schemes, and using conditional loans. Ensuring remunerative and stable markets for agricultural commodities and products that do not harm forests is critical to successfully encouraging good practice.

The private sector has led the way in defining commitments to eliminate deforestation from agricultural supply chains, but operationalization of these remains limited. Leadership from government is recognized as necessary to achieve progress at scale. "Producer countries" can develop binding national or commodity-specific social and environmental standards adapted to national conditions and expectations, assurance systems and branding strategies, to appeal to international markets. "Consumer countries" can adopt regulatory instruments or fiscal measures favouring access to their domestic markets for products that have not caused deforestation or forest degradation. Due diligence approaches may be instrumental in these dynamics.

Finally, governments can boost investment at scale for transforming agrifood systems and halting deforestation; government action on creating an enabling environment is a prerequisite for public and private investment. Blended finance and green bonds are options to mobilize and channel additional finance to more sustainable agricultural practices. De-risking instruments can lift barriers for increased private investment in the transition to "forest-positive" agriculture. REDD+ result-based payments and other carbon-related funds or markets can form part of the financing

Figure 1 The role of government in halting deforestation from agricultural value chains


1
Establish an enabling environment and enforce legality:
Develop and implement a coherent national policy and regulatory framework
Facilitate vertical and horizontal multi-stakeholder collaboration toward a common agenda
Strengthen decentralized authorities
Enforce the legal framework and promote legality
Strengthen tenure and resource rights, protect vulnerable groups
2
Design and support forest, land use and agricultural monitoring systems that enable better policymaking
Develop forestry, land use and agricultural monitoring systems that generate data and are suitable to inform policymaking
Institutionalize monitoring systems and cross-sectoral collaboration
3
Invest in capacity development and knowledge generation for producers
Provide extension services and technical assistance to producers
Invest in research and development for agricultural technologies and innovation
What role for governments?
4
Establish measures and incentives to develop and strengthen legal and sustainable agricultural value chains
Repurpose agricultural subsidies and financial incentives to consider value of natural capital and ecosystem services
Adopt measures to support markets for legal and sustainable agricultural products
Engage with international regulatory developments
Promote innovative public finance to support sustainable production systems and foster responsible private investment
Integrate forest considerations across investment plans

Source: Authors' own elaboration.

This paper summarizes the current state of concepts and approaches for addressing deforestation in the trade, marketing, and production of agricultural commodities that have a disproportionate impact on forests at international, national, and landscape level. To date, predominant attention has been directed towards the role of the private sector and "consumer countries" that shape market regulation. **This publication aims to complement the international discourse by generating a greater focus on the role of "producer country" governments at the national and local level to support efforts to decouple agricultural production from deforestation.**

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Global agrifood systems and forests

1

1.1 Context and definitions

Agrifood systems are increasingly connected, with global trade in the agriculture sector accounting for approximately USD 1.7 trillion in trade flows in 2020 (United Nations, 2022). Agrifood systems comprise all activities related to the production, aggregation, processing, distribution, consumption and disposal of agricultural commodities (FAO, 2018a); the global dynamics of modern agrifood systems mean these activities may take place in separate countries. Most activities are dependent on natural resources, including the utilization of land for cropping and grazing, water for irrigation, biomass for food product packaging, wood fuel for cooking, biodiversity for food diversity, etc. (UNEP, 2016). Agricultural production is highly dependent on the environmental services forests and trees provide, including as habitat for pollinators, water regulation, soil fertility and carbon sequestration. However, globally **approximately 90 percent of deforestation is attributable to the expansion of agriculture** (FAO, 2022a), which has a negative impact on associated ecosystem services, such as carbon sequestration and biodiversity (FAO, 2016; Laurance *et al.*, 2014). The majority of this deforestation occurs in the tropics and subtropics.

The global agrifood system faces major pressures that will continue to shape its transformation over the next decade. By 2050, the **world may need to produce up to 50 percent more food** compared to 2012, based on current projections of population growth and food demand (FAO, 2018b). It is estimated that between **165 and 600 million more ha of land are needed** for crop and livestock production, much of which is currently covered by forests and other critical ecosystems – even if productivity increases (FAO, 2018b; WRI, 2019). Yield increases alone would be insufficient to meet projected demand, and must be paired with other interventions, including restoration of degraded land and reduction of food loss and waste, to ensure a positive impact on forest cover (WEF, 2021a; Ngoma *et al.*, 2018). More sustainable production systems and more equitable distribution of income and food, across and within countries, can alleviate pressures on forests from agricultural expansion (FAO 2018b).

Climate change is already impacting food security, and is projected to adversely affect crop yields in the tropics and subtropics, where rural livelihoods are particularly at risk (IPCC, 2019). Solutions to achieve food security while safeguarding natural resources must be put in place if the world intends to successfully tackle the "quadruple planetary emergency" it now faces, with intertwined challenges for climate, global health, food security, economy, livelihoods, equality and biodiversity.

Continued expansion of unsustainable agriculture into carbon-rich ecosystems, such as natural forests, peatlands and mangroves, would be catastrophic for climate change mitigation. **Global agrifood system** are responsible for **up to one-third of global greenhouse gas (GHG) emissions**, with agriculture and associated land use and land use change, including conversion of forests and other high carbon ecosystems, accounting for up to 24 percent of global emissions alone (Crippa *et al.*, 2021). To meet the climate targets that will limit global warming to within 1.5°C of pre-industrial levels, **agricultural emissions must be reduced by two-thirds by 2050** compared to 2010 levels, and at least 585 million ha of agricultural land would need to be reforested (WRI, 2019). Moreover, up to 40 percent of global land area is degraded, affecting nearly half the global population, with detrimental effects on the productive capacity of land and water resources (UNCCD, 2022; FAO, 2022b). Therefore, the world must produce more food, while reducing land use change and meeting climate objectives simultaneously, to tackle some of the most pressing global challenges. Thankfully, there are opportunities to develop sustainable, complementary approaches to food production and forest conservation that benefit both forests and agrifood systems (FAO, 2016a).

1.1.1. Underlying drivers of deforestation and international trade of agricultural commodities

Agriculture, both large- and small-scale, is the major driver of deforestation globally, although the specific factors, actors and type of agriculture driving deforestation and forest degradation vary by landscape and region (Pacheco *et al.*, 2021; FAO, 2022a; Geist and Lambin, 2002). Cropland expansion represented nearly 50 percent of all deforestation from 2000–2018, followed by livestock grazing at 38.5 percent (FAO, 2022a). Market influences drive the supply of, and demand for, agricultural commodities associated with forest conversion and degradation. Global population growth and shifting dietary preferences due to increased affluence are two major contributors to this pattern, increasing both domestic and international demand (Weinzettel *et al.*, 2013). Where demand for a commodity remains constant, increasing agricultural productivity may reduce pressure on forests (Alemagi *et al.*, 2015), but many commodities associated with forest conversion are characterized by rapidly increasing demand, thus increasing pressure to convert forests to agricultural land for commodity production. This is the case for protein-based food products and their value chains, as well as oil crops for other food products, cosmetics, personal care products and other household items. Increasingly, smallholders are producing commodities such as cocoa, palm oil, maize and cattle to meet growing domestic demand linked to urbanization (Pacheco *et al.*, 2021).

Agricultural expansion is highly susceptible to commodity prices and exchange rates, as well as weaknesses in governance (Byerlee, Steveson and Villoria, 2014; Ingalls *et al.*, 2018). Approximately 31 percent of the increase in soybean production that expanded in Brazil, Paraguay and Bolivia during the mid-1990s was attributable to

devaluation of local currencies; conversely, the rise of the Brazilian real in the 2010s spared an estimated 85 000 km^2 of land, around half of which is in the Amazon (Richards *et al.*, 2012; Richards, 2021). As regions become more connected to global and regional food systems, they are more susceptible to fluctuations in global financial markets, and strong national currencies may result in outsourcing agriculture – and associated impacts on forests – to other countries, where production costs are cheaper and land governance is weaker.

Governments have responded to domestic and international pressures on forests in recent years, mandating sustainability standards and strengthening law enforcement and monitoring to prevent illegal deforestation (Box 1), and even, increasingly including them in strategies and plans to reduce deforestation. However, the majority of tropical forest conversion to agriculture is illegal and in violation of national laws; one study estimated this accounted for nearly 70 percent of tropical deforestation between 2013 and 2019 (Forest Trends, 2021). In many cases, development of roads for mining and logging operations is followed by the development of agriculture around the roadways. In other cases, land speculation and encroachment on public forestlands and the lands of Indigenous Peoples and local communities is coupled with illegal and/or informal activities (Pacheco *et al.*, 2021).

Box 1
Defining illegal deforestation

Illegal deforestation can be understood as forest conversion conducted in violation of the national legislation in force at the time of forest clearance.

This may include forest and other sectoral laws, anti-corruption laws, laws related to land and forest tenure and laws related to the rights of Indigenous Peoples and local communities, among others. Illegalities may occur at licensing, such as granting a licence for forest clearance in the absence of land use permits, environmental impact assessments or absence of a licence. They may also occur during forest clearance, such as clearing outside the authorized boundaries or tax evasion. Assessing the legality of land use conversion requires information at the local level and often constitutes a challenge for remote stakeholders and global forest monitoring systems.

Source: FAO and UNEP. 2020. *The State of the World's Forests 2020. Forests, biodiversity and people*. Rome, FAO.; **Forest Trends.** 2014. Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations. In: *Forest Trends*. Washington, DC. Cited 14 August 2022.; **Forest Trends.** 2021. Illicit Harvest, Complicit Goods: The State of Illegal Deforestation for Agriculture. In: Forest Trends. Washington, DC. Cited 16 August 2022.

While trends in demand for certain commodities, and land use changes linked to the production and trade of these - as well as the landscapes affected - may change over time, expansion of agriculture in forest areas is anticipated to continue in high profile hotspots, such as the Amazon and Congo Basins, but also others, including the Cerrado and Chaco regions, the Miombo and Guinea woodlands and the Lower Mekong region (Pacheco *et al.*, 2021).

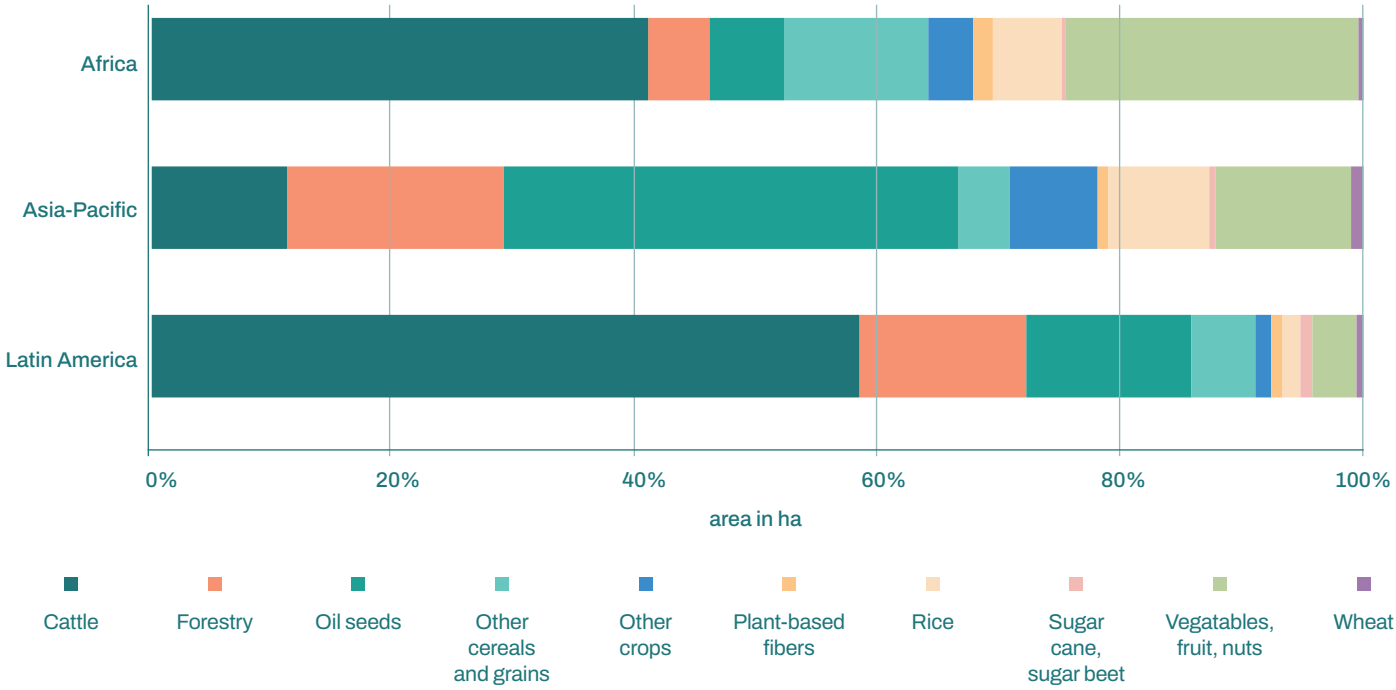
1.1.2 Commodities associated with forest conversion

Both commercial and subsistence production of agricultural commodities is associated with deforestation and forest degradation. The main agricultural commodities commonly associated with forest conversion and tree loss are beef, soy and palm oil, and to a lesser extent, coffee, cocoa, rubber, timber and pulp (Goldman *et al.*, 2020). Cultivation of soy and beef are major contributors to forest conversion in Latin America, while palm oil production, both large- and small-scale, is a major contributor to deforestation and peatland degradation in South East Asia (Pacheco *et al.*, 2021). Cocoa, palm oil and rubber cultivation have a considerable impact on deforestation and forest degradation in West Africa, with forest losses to cocoa cultivation estimated at 2.3 million ha between 1988 and 2007 (Carodenuto, 2019). Despite yield improvements for soy and palm oil, land expansion has been pivotal to production increases in recent decades (WEF, 2021b).

Figure 2 shows the estimated proportion of the main agricultural commodities contributing to forest conversion in each tropical region.

A significant proportion of the production of commodities associated with forest conversion is destined for export to international markets to feed demand in other countries, and as such, deforestation from production and processing of these commodities is intricately tied to international trade. According to one analysis, between 2013 and 2019, more than 30 percent of total tropical forest loss resulted from export-oriented agriculture (Forest Trends, 2021). This deforestation and the resulting emissions are said to be "embodied" in the import of a particular commodity. The concept of "embodied deforestation" places emphasis on the shared responsibility of "producer countries" where forests are cleared for commodity production and "consumer countries", or the countries that drive international demand for, and consumption of, these commodities or their end product. Figure 2 illustrates these dynamics for cocoa.

Figure 2 Estimated percentage of tree cover loss attributed to crops, livestock and forestry for domestic and international consumption in 2005–2018



Source: Authors' own elaboration. Data from **Pendrill, F., Persson, U.M., Kastner, T., & Wood, R.** 2022. Zanodo. In: OpenAIRE. *Deforestation risk embodied in production and consumption of agricultural and forestry commodities 2005–2018* (1.1).

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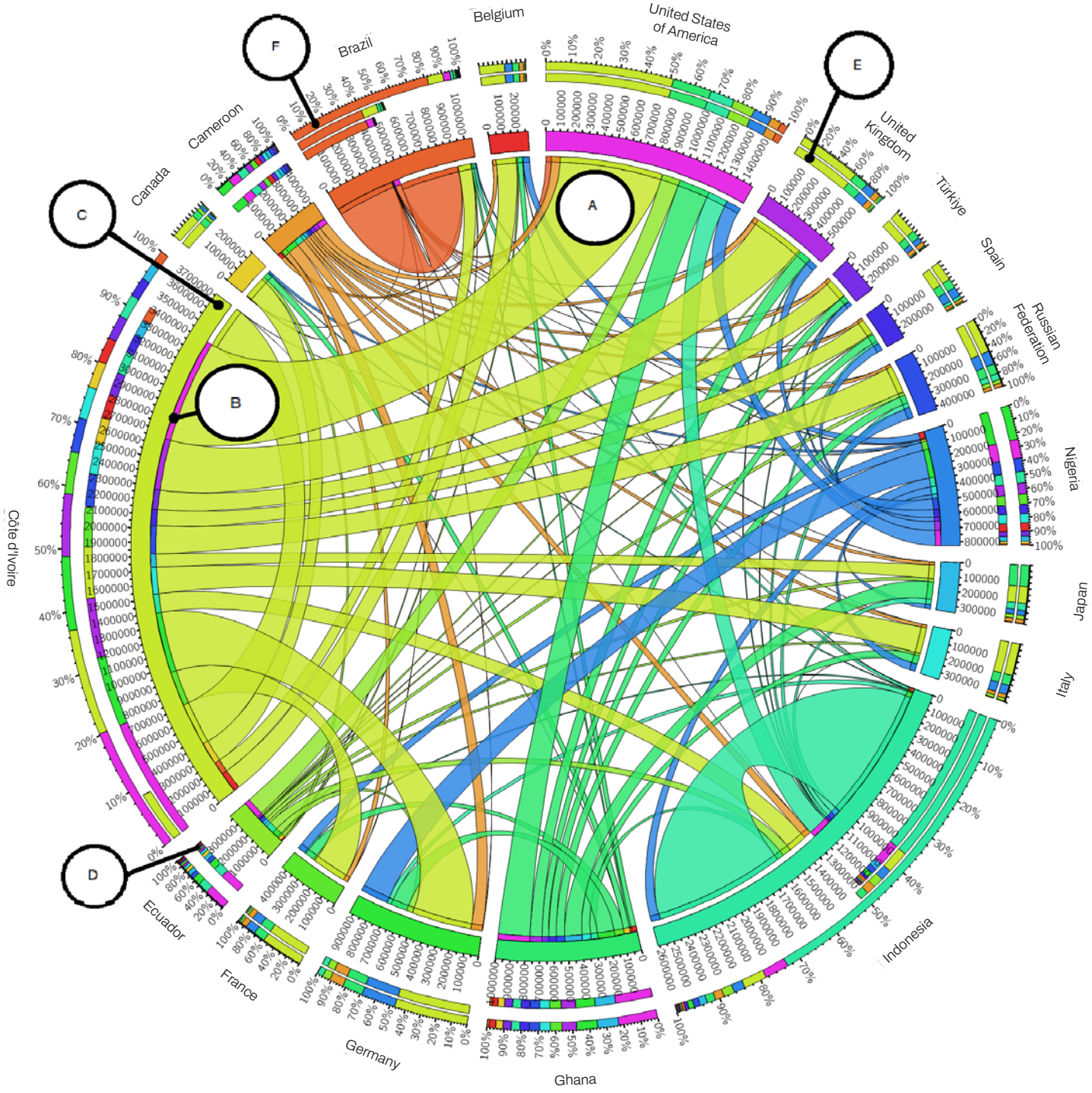
Figure 3 Flow of cropland harvested for cocoa production (ha) embedded in trade, by origin and destination, 2019



Note: The countries represented account for 64 percent of the total cropland harvested for cocoa production in 2019. This graph includes seven countries of origin, three of which (Indonesia in turquoise green, Brazil in orange and Côte d'Ivoire in pistachio green) have important domestic markets for cocoa and two of which (Indonesia and Brazil) are import destinations. Items A–F should be referenced to read the figure:

A: Export of harvested area (in ha) from Côte d'Ivoire (the country in pistachio green) to the United States of America (in pink);

B: The innermost ribbon gives the colour of the importing country, for example pink because the United States of America is the destination;

C: The second ribbon gives the colour of the exporting country (Côte d'Ivoire in this case);

D: The third ribbon also gives the exports of harvested area (in ha) split according to destination countries/regions;

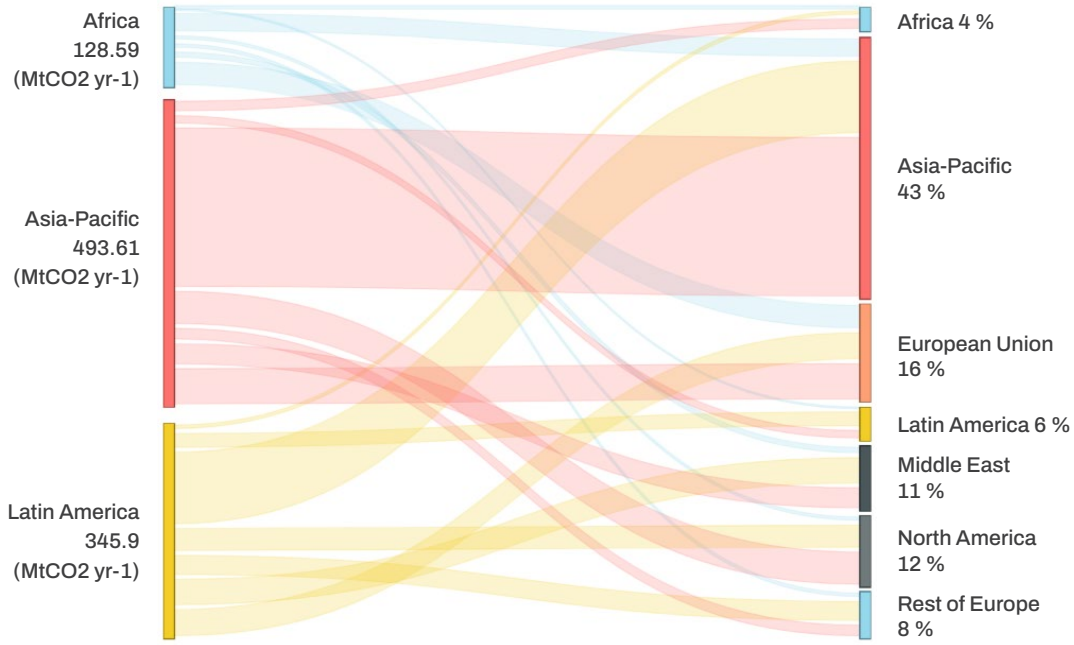
E: The fourth ribbon gives the imports split according to origin;

F: The outer ribbon gives the share of the exports that each destination receives.

Source: Elaborated by BC3 and the authors using FAO data.

The largest inter-regional trade flow of the main commodities associated with forest conversion is from Latin America to the Asia-Pacific, while the largest intra-regional flow is within the Asia-Pacific region (Pendrill *et al.*, 2019b; Pendrill *et al.*, 2022). The most prevalent destination for emissions from deforestation embodied in trade of agricultural or forest commodities is the Asia-Pacific region, receiving 43 percent of the emissions embodied in trade from 2005–2018, followed by Europe at 26 percent of emissions, taking into account both European Union and non-European Union countries (Figure 4) (Pendrill *et al.*, 2019b; Pendrill *et al.*, 2022).

Figure 4 Estimated greenhouse gas (GHG) emissions from deforestation embodied in trade flows from tropical regions due to the production of agricultural commodities associated with forest conversion annually from 2005–2018



Note: Estimated GHG emissions (in MtCO2 yr-1) from deforestation embodied in trade flows from tropical regions due to the production of the main agricultural commodities associated with forest conversion annually from 2005–2018, based on the multiregional input output model; excludes domestic production/consumption. [Associated net emissions: includes losses in above-ground, below-ground and soil (including peat drainage) carbon (in MtCO2/yr)].

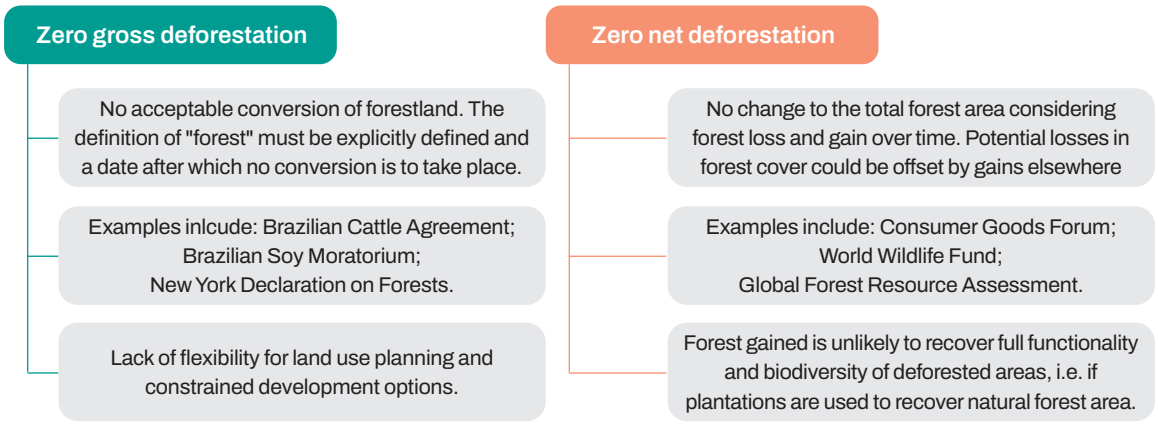
Source: Authors' own elaboration. Data from **Pendrill, F., Persson, U.M., Kastner, T., & Wood, R.** 2022. Zanodo. In: OpenAIRE. *Deforestation risk embodied in production and consumption of agricultural and forestry commodities 2005–2018* (1.1).

1.1.3 The "deforestation-free" / "zero deforestation" paradigm and rise of "forest positive"

The deforestation-free agriculture paradigm, used in various initiatives and by some countries, is broad and varies based on contextual definitions of forests and objectives for how deforestation should be considered. While this terminology is not internationally endorsed, and its use is not promoted by this technical paper, it has become common language for many public and private stakeholders. Definitions of deforestation-free agriculture, when the term is used, vary by country and stakeholder, and by objectives that are underpinned by the range of national and international forest definitions tied to public and private sector commitments to halt deforestation. The terms "deforestation-free", "zero gross/net deforestation" and "zero illegal deforestation" are often used interchangeably (Brown and Zarin, 2013; FAO, 2018b). The diversity in terminology and their meaning can lead to practical challenges, as stakeholders struggle to interpret and align themselves with often interchangeable definitions and understand how to balance deforestation-free commitments with economic development (Lyons-White and Knight, 2018).

When vague definitions such as "zero deforestation," "no deforestation" and "deforestation free" are used in commitments, it could imply there will be no forest loss whatsoever, whether the term is subsequently defined or not. Clear distinctions should be made between "zero gross deforestation" and "zero net deforestation", two of the most utilized concepts (Figure 5). It may prove beneficial for national governments to define these concepts, serving to facilitate dialogue between "producer countries" and "consumer countries" to ensure compatibility of "producer country" definitions and practices with relevant trade regulations and due diligence requirements. Moreover, it could signal national objectives to private sector actors seeking to invest in, or source from, landscapes, subnational jurisdictions or countries making progress in halting deforestation from agricultural commodities.

Figure 5 Zero gross deforestation and zero net deforestation compared


Zero gross deforestation
No acceptable conversion of forestland. The definition of "forest" must be explicitly defined and a date after which no conversion is to take place.
Examples inlcude: Brazilian Cattle Agreement; Brazilian Soy Moratorium; New York Declaration on Forests.
Lack of flexibility for land use planning and constrained development options.
Zero net deforestation
No change to the total forest area considering forest loss and gain over time. Potential losses in forest cover could be offset by gains elsewhere
Examples include: Consumer Goods Forum; World Wildlife Fund; Global Forest Resource Assessment.
Forest gained is unlikely to recover full functionality and biodiversity of deforested areas, i.e. if plantations are used to recover natural forest area.

Source: Brown, S. & Zarin, D. 2013. *What Does Zero Deforestation Mean?* Science, 342(6160): 805–8807.; **FAO.** 2018b. *Zero-deforestation commitments: A new avenue towards enhanced forest governance?* Rome, FAO.

The Accountability Framework initiative (AFi), an international coalition of civil society and non-profit organizations seeking to boost ethical agricultural and forest product supply chains, has undertaken efforts to make these terms more accessible. Through multistakeholder processes, AFi developed the Accountability Framework, standardizing definitions of forest, deforestation, and related terms, seeking to increase alignment among existing tools, standards and frameworks (Weber and Partzsch, 2018). The Accountability Framework highlights zero-net deforestation "*is not an appropriate metric for characterizing the forest and land-use footprint of company operations*" (AFi, 2019a). Rather, it recommends companies use "no gross deforestation" - which is enshrined in the 2014 New York Declaration on Forests (NYDF) - in commitment targets and outcome monitoring. The AFi argue this better reflects the ecological and cultural value of natural forests, noting the framework separates the tracking of natural forests and tree plantations for quantifying forest loss and gain (AFi, 2019a; AFi, 2019b). It also covers other important issues, such as child labour and human rights considerations. Launched in mid-2019, the Accountability Framework is a significant step toward enabling the operationalization of existing commitments and can be a source of reference for governments seeking to understand existing private sector standards and terminology.

In recent years, the concept of "forest positive" has become popularized among private sector associations and public-private initiatives, such as the Consumer Goods Forum (CGF), the World Business Council for Sustainable Development (WBCSD) and the Tropical Forest Alliance (TFA). "Forest positive" is generally understood amongst consumer goods companies as a systematic approach to eliminating deforestation, forest degradation and conversion, not only from supply chains, but also from business models. It entails supporting sustainable forest management, restoration and integrated land use planning in key production landscapes for *positive* impact on forests, while supporting local communities" and workers" rights and improving livelihoods (CGF, 2021b). Companies that source agricultural and forestry products alike have started developing "forest positive" strategies, and increasingly recognize the opportunity for returns on investment in their efforts to reduce deforestation (Box 2).

Box 2
The costs of deforestation and the investment opportunity

The cost of deforestation embodied in international trade is not just in exacerbating greenhouse gas (GHG) emissions, but also in economic losses for "producer countries". Global annual net losses from ecosystem destruction due to international trade are estimated at over USD 1.7 trillion; the rents for agricultural and livestock practices on converted forestland usually fail to compensate governments sufficiently for this considerable economic loss, which has long-lasting repercussions (Chang *et al.*, 2016).

If regenerative agricultural production and approaches such as forest protection and restoration can be implemented by 2030, the economic benefits are estimated to reach up to approximately USD 2 trillion globally; this could require USD 75–105 billion in global investment (Food and Land Use Coalition, 2019). Domestic and international sources of public finance, including climate finance and REDD+ results-based payments (RBPs) (RBPs, can be used to de-risk investment in agriculture and forestry and mobilize new opportunities for "producer countries" to access forest positive finance.

Note: (2014 international dollars [I$] [Chang *et al.*, 2016)] This estimate is conservative and is based on zero production costs. If it considered reductions to yields, given degradation often intensifies over time, and production costs above zero, the figure would likely be higher than USD 1.7 trillion.)

Source: Chang, J., Symes, W.S., Lim, F. & Carrasco, L.R. 2016. *International trade causes large net economic losses in tropical countries via the destruction of ecosystem services*. Ambio, 45: 387–397.; **Food and Land Use Coalition.** 2019. *Growing Better: Ten Critical Transitions to Transform Food and Land Use.* Global Consultation Report.

1.2 International initiatives and collective aspirations for halting deforestation

1.2.1 Global momentum to halt deforestation

The contribution of forests and trees to biodiversity, agriculture, human health, livelihoods and climate are increasingly studied and recognized. Over the last 15 years, multilateral commitments to halt deforestation have proliferated, in recognition of the detrimental impacts of forest loss and the complex, interlinked drivers of deforestation and forest degradation (Figure 6). Under the scope of the United Nations Framework Convention on Climate Change (UNFCCC), a framework for reducing deforestation and forest degradation and encouraging the sustainable management, enhancement and conservation of forests (REDD+) was negotiated over the course of a decade, explicitly recognizing the importance of forests in climate change mitigation. REDD+ is a voluntary process under the UNFCCC through which developing countries can contribute to the fight against climate change through specific interventions (policies and/or measures) to reduce GHG emissions related to conversion of forests or the enhancement of carbon stocks, while strengthening capacities and potentially unlocking payments for results in emission reductions and removals. The 2015 Paris Agreement reiterated the role of REDD+, recognizing both the potential role of agriculture in climate change mitigation and adaptation as well as the risks posed to food security by rising global temperatures.

Since negotiations began on REDD+, countries have received support from key initiatives, such as the UN-REDD Programme and the Forest Carbon Partnership Facility (FCPF), as well as other bilateral and multilateral funding sources, to fulfil UNFCCC requirements for REDD+, also known as the Warsaw Framework. RBPs have been made by FCPF Carbon Fund and the Green Climate Fund (GCF) to multiple countries that have reported REDD+ results. More recently, the Lowering Emissions by Accelerating Forest finance (LEAF) Coalition mobilized USD 1 billion of public and private funding to incentivize large-scale tropical forest protection with the goal of halting deforestation. Likewise, voluntary carbon markets have grown, with expected additional demand for forest carbon credits for compliance purposes under Article 6 of the Paris Agreement, which enables international voluntary cooperation for climate change mitigation. In addition, the Global Environmental Facility (GEF) has invested USD 450 million across two integrated impact programmes, on Drylands Sustainable Landscapes (DSL-IP) and Food Systems, Land Use and Restoration (FOLUR-IP). These programmes are supporting 36 countries as they work to apply sustainable and integrated management of production landscapes and promote efficient and sustainable, 'deforestation-free" food value and supply chains as part of their transformation to more sustainable agriculture, to achieve global environmental benefits.

Other agreements have made explicit commitments to halting deforestation: the Aichi Biodiversity Targets negotiated under the Convention on Biological Diversity (CBD) called for the rate of forest loss to be "at least halved" by 2020, and for degradation and fragmentation to be significantly reduced. Under Agenda 2030, the 2015 Sustainable Development Goals (SDGs) called for halting deforestation by 2020 (Target 15.2), as did the Global Forest Goals (GFG) of the United Nations Strategic Plan for Forests 2030 (UNSPF) 2017–2030 (Target 1.3). More than 100 countries have set voluntary targets to achieve land degradation neutrality (LDN) by 2030 to the United Nations Convention to Combat Desertification (UNCCD). In 2019, the United Nations Secretary-General announced an initiative to turn the tide on deforestation, tasking the Executive Committee with UN system-wide mobilization toward this end.

Civil society action and multistakeholder advocacy has been key to slowing natural forest loss and eliminating deforestation from the production of agricultural commodities, both goals reflected in the 2014 New York Declaration on Forests (NYDF). The NYDF has more than 200 signatories, including at least 60 multinational companies and 41 national governments, non-governmental organizations (NGOs), Indigenous Peoples" groups and international organisations (NYDF Assessment Partners, 2019). Although critical actors, the efforts of subnational governments are often hampered by a lack of sustained financial support. Twenty-one subnational governments endorsed the NYDF and more than 30 signed the Rio Branco Declaration to reduce deforestation by 80 percent by 2020; however, the Rio Branco Declaration was contingent on external funding, which failed to materialize (Stickler *et al.*, 2018b). Other frameworks and commitments that engage subnational governments include the Governors" Climate and Forests Task Force, established in 2009, which convenes stakeholders from 39 member states and provinces within a collective theory of change and the Under 2 Coalition, under which 27 jurisdictions committed to reducing emissions by 80–95 percent below 1990 levels by 2050 (Stickler *et al.*, 2018b).

While 2020 targets to halt deforestation have not been met, public and private actors alike have renewed and strengthened their commitments, with notable announcements in the lead-up to, and during, the 26th Conference of the Parties (COP) of the UNFCCC held in Glasgow in November 2021. Endorsers of the NYDF, for instance, negotiated a "refreshed" declaration, which includes commitments to end the loss and degradation of natural forests by 2030 and to reach the private sector goal of eliminating deforestation from the production of agricultural commodities well before 2030. The 144 government endorsers of the 2021 Glasgow Leaders' Declaration on Forests and Land Use, covering more than 90 percent of the world's forest area, committed "to working collectively to halt and reverse forest loss and land degradation by 2030, while delivering sustainable development and promoting an inclusive rural transformation". The declaration's text explicitly recognizes the importance of aligning development and trade policies, investments, agricultural development policies and programmes and financial flows with sustainable agriculture and land use objectives and ensuring they do not drive deforestation or forest degradation. It highlights the need to enhance resilience and reaffirms a commitment to mobilizing public and private finance and

support, including for Indigenous Peoples and local communities. Also at COP26, 28 governments of the Forest, Agriculture and Commodity Trade (FACT) dialogue released a roadmap for action covering trade and market development, smallholder support, traceability and transparency, and research, development and innovation. In addition, 45 countries announced commitments to shift to more sustainable agriculture, while 26 endorsed the Policy Action Agenda for the Transition to Sustainable Food and Agriculture; this lays out pathways for governments to repurpose public policies and scale up innovation for sustainable agriculture.

Other notable public pledges related to forests include the mobilization of USD 1.7 billion to advance Indigenous Peoples' and local communities' forest tenure rights and USD 12 billion in public finance. The funds mobilized via public finance will support improvements to governance and land tenure, "deforestation-free and sustainable agricultural supply chains" and the systems, implementation and financial mechanisms needed to uphold them, as well as "deforestation-free finance", including for "sustainable deforestation-free agriculture". Private pledges to address deforestation linked to agricultural commodities include an investor-led commitment by more than 30 financial institutions, managing over USD 8.7 trillion in assets, to eliminate agricultural commodity-driven deforestation risks in their investment and lending portfolios by 2025; another pledge is comprised of 10 major agricultural commodity companies committed to developing a roadmap for advancing supply chain action to halt deforestation and reduce GHG emissions. In addition, more than 90 companies declared their intention to become "nature-positive" by 2030. Together, the COP26 commitments to achieving sustainable agriculture and halting deforestation, and the financing dedicated to meet them, could contribute to achieving the 2021 UN Food Systems Summit coalition goal of halting deforestation and conversion from agricultural commodities and relevant objectives included in countries' national pathways for food systems transformation defined as a main outcome of the Summit.

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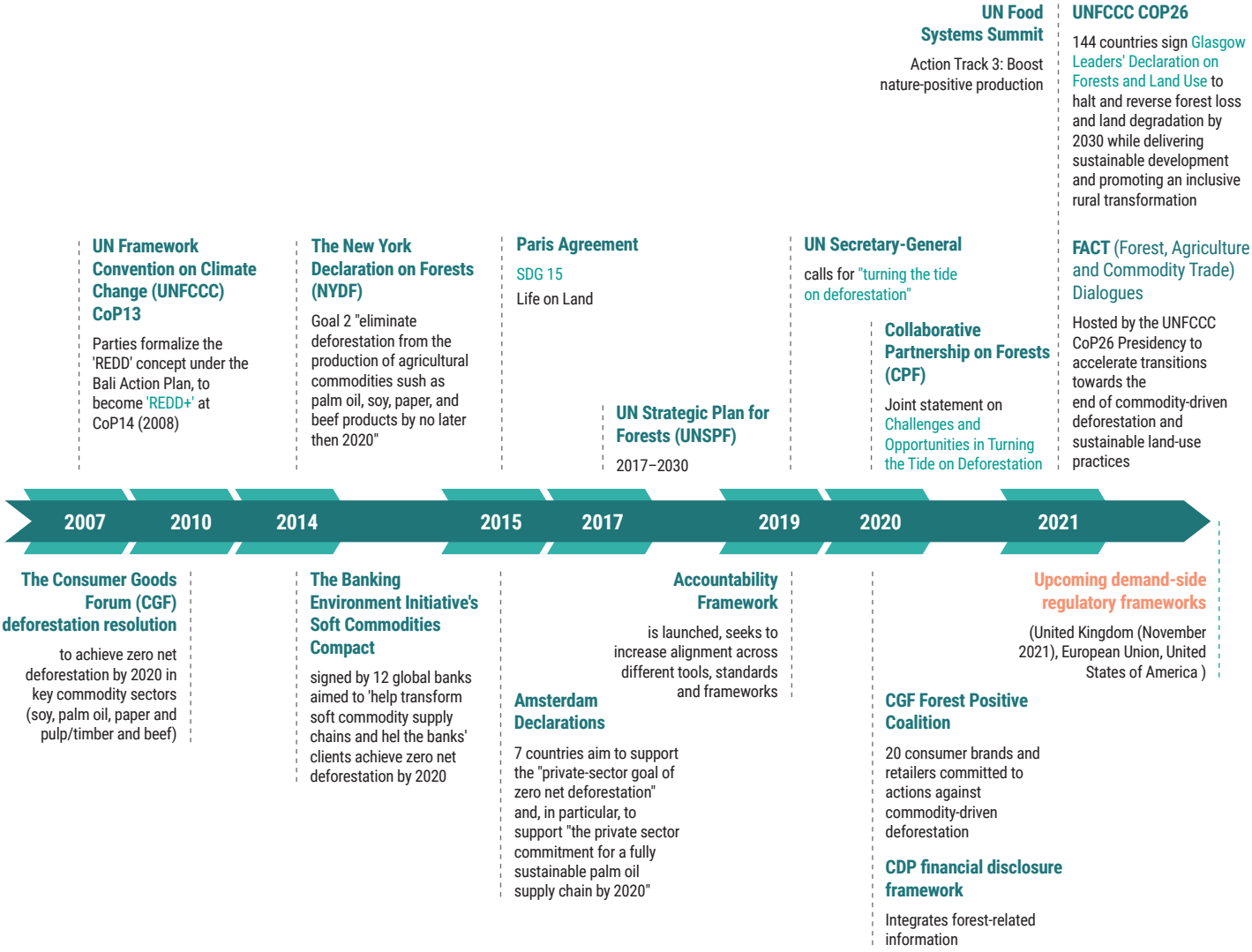
Figure 6 Global initiatives and private sector commitments to halt deforestation from agriculture


UN Food Systems Summit
Action Track 3: Boost nature-positive production
UNFCCC COP26
144 countries sign Glasgow Leaders' Declaration on Forests and Land Use to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation
UN Framework Convention on Climate Change (UNFCCC) CoP13
Parties formalize the 'REDD' concept under the Bali Action Plan, to become 'REDD+' at CoP14 (2008)
The New York Declaration on Forests (NYDF)
Goal 2 "eliminate deforestation from the production of agricultural commodities sush as palm oil, soy, paper, and beef products by no later then 2020"
Paris Agreement
SDG 15
Life on Land
UN Secretary-General
calls for "turning the tide on deforestation"
FACT (Forest, Agriculture and Commodity Trade) Dialogues
Hosted by the UNFCCC CoP26 Presidency to accelerate transitions towards the end of commodity-driven deforestation and sustainable land-use practices
Collaborative Partnership on Forests (CPF)
Joint statement on Challenges and Opportunities in Turning the Tide on Deforestation
UN Strategic Plan for Forests (UNSPF)
2017–2030
2007
2010
2014
2015
2017
2019
2020
2021
The Consumer Goods Forum (CGF) deforestation resolution
to achieve zero net deforestation by 2020 in key commodity sectors (soy, palm oil, paper and pulp/timber and beef)
The Banking Environment Initiative's Soft Commodities Compact
signed by 12 global banks aimed to 'help transform soft commodity supply chains and hel the banks' clients achieve zero net deforestation by 2020
Accountability Framework
is launched, seeks to increase alignment across different tools, standards and frameworks
Amsterdam Declarations
7 countries aim to support the "private-sector goal of zero net deforestation" and, in particular, to support "the private sector commitment for a fully sustainable palm oil supply chain by 2020"
Upcoming demand-side regulatory frameworks
(United Kingdom (November 2021), European Union, United States of America)
CGF Forest Positive Coalition
20 consumer brands and retailers committed to actions against commodity-driven deforestation
CDP financial disclosure framework
Integrates forest-related information

Source: Authors' own elaboration.

1.2.2 Government initiatives in "consumer countries"

The proliferation of information pertaining to the contribution of "consumer countries" demand for, and import of, certain agricultural commodities to forest conversion and biodiversity loss has driven growing public awareness of the issue. Civil society advocacy has contributed to the call to action on agriculture-driven deforestation by governments that have linked consumption patterns to deforestation. The non-legally binding Amsterdam Declarations, signed in 2015, are a set of political commitments by nine European countries aligned to the SDGs, the NYDF and private sector goals, to eliminate deforestation from global supply chains. Several Amsterdam Declarations signatories have taken targeted steps to accomplish "zero net deforestation", for example, through strategy development and legislative proposals that would require due diligence to be applied to the import of agricultural commodities commonly associated with deforestation. France's National Strategy against Imported Deforestation 2018–2030 is a prominent example, outlining demand side actions to better understand how to and take action to reduce a "consumer country's" deforestation footprint. These actions include, inter alia, promoting the integration of sustainable forest management into trade agreements, enhancing cooperation between "consumer" and "producer" countries, and ensuring "zero-deforestation" (as referred to in the strategy) public policy and procurement.

At the European Union level, the European Green Deal includes in its agriculture component the objective of reducing the environmental and climate footprint of the European Union's food system. Among other related measures, it tackles the issue of imported deforestation, by outlining the intention to build on the 2019 European Union communication "Stepping up EU Action to Protect and Restore the World's Forests". In practice, the

European Union will take regulatory measures to promote value chains and products that do not cause deforestation and forest degradation and prevent imports linked to deforestation. This new legislative framework, presented by the European Commission in November 2021 and is under discussion at the time of writing this paper, will build upon insight from the 2010 EU Timber Regulation (EUTR). It expands the use of due diligence systems to other agricultural commodities and focuses on avoiding negative impacts on forests in addition to legality criteria. The United Kingdom of Great Britain and Northern Ireland adopted the Environment Act in November 2021, which aims to ensure due diligence is conducted by large businesses operating in the United Kingdom of Great Britain and Northern Ireland importing key agricultural commodities associated with deforestation and related products. It will require businesses to undertake due diligence to assess the risk that any agricultural commodities they use that are commonly associated with deforestation are produced illegally, or do not comply with local laws on land use and land ownership in "producer countries". In the United States of America, a bill has been introduced that would oblige importers to trace their supply chains and prove that certain agricultural commodities and related products were not sourced on illegally deforested land. Like the proposed European Union legislation, it foresees assistance to "producer countries" to improve legal frameworks, enforcement capacities, monitoring and traceability and land tenure data; moreover, it proposes the establishment of preferential public procurement measures for commodities produced on land that was not deforested.

To date, "consumer countries"' political commitments to tackle deforestation from agricultural commodities have predominantly emerged in Europe and North America (FAO, 2018b). Yet recent growth in the export of commodities associated with deforestation to the Asia-Pacific region represents a risk for leakage of emissions reductions from countries with strong governance and enforcement to those with weaker capacities (zu Ermgassen *et al.*, 2020; Taylor and Streck, 2018), if these governments do not undertake similar commitments and actions on embodied deforestation [Box 3]. The European Green Deal echoes this point, underlining that leakage is likely if the European Union's international partners do not share similar ambitions. Commitments to reduce deforestation could thus be more impactful if adopted more broadly across countries that serve as major trading and processing hubs, even if end consumption takes place elsewhere. Notably, governments representing key markets in the Asia-Pacific and other regions have endorsed the Glasgow Leaders' Declaration on Forests and Land Use, although it remains to be seen how the commitment will be put into practice.

Box 3
The persistent challenge of leakage

It is important to recognize that changing expectations of how commodities are produced in one landscape may have significant impacts on other landscapes. Leakage or "spillover" can occur when reducing deforestation is achieved in one location, but deforestation or other ecosystem loss occurs in another location as a result of interventions in the initial target location; leakage is likely to occur whenever interventions limit production, unless demand is reduced or met by other means (Boucher and Elias, 2013; Lambin *et al.*, 2018; Heilmayr, Carlson and Benedict, 2020; Ingalls *et al.*, 2018). Some "deforestation free" definitions acknowledge and allow for leakage to some degree; "zero net deforestation" permits deforestation if forest gains can be made elsewhere, although a restored forest does not provide the same level of ecosystem services as primary forests.

The seven REDD+ safeguards agreed by parties to the UNFCCC, known as the Cancún safeguards, recognize the importance of avoiding "displacement" of emissions from one area to another, "reversals" of achievements in emissions reductions and the replacement of natural forests with planted forests. Leakage could take place across and between subnational landscapes as well as ecosystems, but also at the international level across borders and between regions. Addressing this risk requires multilevel strategic integration in the production and trade of commodities commonly associated with deforestation (Byerlee et al with Byerlee, Steveson and Villoria, 2014). Leakage or reversals also have a temporal component: if restrictions are put in place to achieve "deforestation free" production with "cut-off dates" in the future, deforestation may spike in the interim.

Source: Boucher, D. & Elias, P. 2013. *From REDD to deforestation-free supply chains: the persistent problem of leakage and scale*. Carbon Management, 4(5): 473–475.; **Byerlee, D. Steveson, J. & Villoria, N.** 2014. *Does intensification slow crop land expansion or encourage deforestation?* Global Food security, 3(2): 92–98.; **Heilmayr, R., Carlson, K.M. & Benedict, J.J.** (2020). *Deforestation spillovers from oil palm sustainability certification*. Environmental Research Letters, 15(7): 075002.; **Ingalls, M.L., Meyfroidt, P., Xuan To, P., Kenney-Lazar, M. & Epprecht, M.** 2018. *The transboundary displacement of deforestation under REDD+: Problematic intersections between the trade of forest-risk commodities and land grabbing in the Mekong region.* Global Environmental Change, 50: 255–267.; **Lambin, E.F., Gibbs, H.K., Heilmayr, R. Carlson, K.M. Fleck, L.C. Garrett, R.D. le Polain de Waroux, Y. *et al.*** 2018. *The role of supply-chain initiatives in reducing deforestation*. Nature Climate Change, 8: 109–116.

1.2.3 Governmental initiatives in "producer countries"

"Producer countries" of agricultural commodities and timber in the tropics and subtropics face unique sets of national circumstances, such as the pressures facing their natural resources - including forests - and challenges and opportunities for achieving national development strategies. Over the last half-century, paradigms around forests and forest management have shifted significantly, and efforts to achieve sustainable management of forests and conservation have ranged from state interventions, such as land use regulations and establishment of protected areas, to market-based approaches, such as payments for ecosystem services (PES), sustainability standards and certification schemes (Pacheco *et al.*, 2021). Countries have enacted reforms and policies to develop an enabling environment, disincentivize forest conversion and incentivize good practices, with varying levels of success (Börner and West, 2018). Experience has shown that a combination of measures tends to provide the best outcomes, and is highly

dependent on local conditions (Börner and West, 2018; Ngoma *et al.*, 2018). Yet efforts to control deforestation and forest degradation, including those caused by fires and illegal logging, have remained largely limited, until recently, to the forestry and environmental sectors.

For "producer countries", REDD+ provided a major and concrete opportunity to convene the agriculture and forestry sectors around halting deforestation. It allowed more than 60 countries to access technical assistance and funding to establish the enabling conditions for, and move towards, REDD+ results through a stepwise approach, via a combination of initiatives. These range from the UN-REDD Programme and Forest Carbon Partnership Facility (FCPF) to the Central African Forest Initiative (CAFI) and bilateral cooperation. More than 20 countries have reported REDD+ results to the UNFCCC or other frameworks, with those officially reporting to UNFCCC reaching about 11.5 billion tonnes of CO_2 equivalent.[1] To date, more than ten countries have been rewarded with results-based finance.

Nearly all countries with National REDD+ Strategies or Action Plans mention the need to undertake interventions in the agricultural sector. Core action areas in this domain include improving production models (Box 4), establishing and putting into practice an enabling environment, and providing extensive, tailored technical and financial support. Yet national REDD+ strategies almost uniquely recognize the link between forest loss and agricultural commodities when compared to other national policy documents, which may be enhanced to recognize potential synergies (Henders *et al.*, 2018). Important synergies between national REDD+ strategies and national pathways for food systems transformation could also be encouraged.

Box 4
Sustainable agricultural intensification and deforestation

Sustainable agricultural intensification has been proposed as a viable solution for halting forest loss, as increased productivity on the same land area can result in less demand for land and reduced deforestation in the right circumstances (Abman and Carney, 2020). Similarly, some authors estimated that if increased use of fertilizers and agrochemicals were implemented in Côte d'Ivoire, Ghana, Nigeria and Cameroon between 1988–2007, rather than agricultural expansion into forest areas, over 21,000 km^2 of deforestation and forest degradation could have been avoided, along with nearly 1.4 billion tonnes of CO_2 emissions (Gockowski and Sonwa, 2011).

However, intensification must not be done in a manner that leads to overuse of inputs or land and water pollution. Improving yields alone could actually result in further encroachment in areas where forest governance is weak and agricultural production is incentivized, particularly over the long term (Angelsen, 2010; Byerlee *et al.;* Byerlee, Steveson and Villoria, 2014; Garrett *et al.*, 2018). To mitigate such risk in an environment of growing climate uncertainty, decision making related to agricultural intensification should be conducted within a larger framework of sustainable and integrated land use planning. Future projections show that yields of major commodities will decrease under future climate change scenarios and production zones for commodities, such as cocoa, could contract (Kroeger *et al.*, 2017; Zhao *et al.*, 2017). Therefore, solutions to control agricultural land expansion cannot solely rely on intensification; improved landscape governance, increased forest protection and sustainable forest and land management are paramount to ensuring sustainable and climate resilient agriculture.

Numerous approaches have emerged for climate smart agriculture that aim to either maintain, or even increase, yields over the long-term. Different sustainable production methods, such as agroecological practices, are appropriate depending upon the environmental, social and cultural and economic conditions of each context (Ngoma *et al.*, 2018). Diversification of production practices, including crop rotation diversification, can increase resilience and support better socio-ecological outcomes, and potentially reduce deforestation (Bowles *et al.*, 2020). Critically, approaches and practices must be selected based on local contexts and the capacities of producers to maximize adoption. The relocation of agribusiness away from the forest frontier has also seen short-term reduction of deforestation; however, in areas where forest governance remains weak, this solution alone may not be enough (Garrett *et al.*, 2018).

Source: **Abman, R. & Carney, C.** 2020. *Land rights, agricultural productivity, and deforestation.* Food Policy, 94. **Angelsen, A.** 2010. *Policies for reduced deforestation and their impact on agricultural production.* Proceedings of the National Academy of Sciences, 107(46): 19639–19644.; **Bowles, T.M., Mooshammer, M., Socolar, Y., Calderón, F., Cavigelli, M.A., Culman, S.W., Deen, W., *et al.*** 2020. *Long-Term evidence shows that crop-rotation Diversification increases agricultural resilience to Adverse Growing conditions in North America.* One Earth, 2(3): 284–293.; **Byerlee, D. Steveson, J. & Villoria, N.** 2014. *Does intensification slow crop land expansion or encourage deforestation?* Global Food security, 3(2): 92–98.; **Garrett, R.D., Koh, I., Lambin, E.F., De Waroux, Y.L.P., Kastens, J.H. & Brown, J.C.** 2018. *Intensification in agriculture-forest frontiers: Land use responses to development and conservation policies in Brazil.* Global Environmental Change, 53: 233–243.; **Gockowski, J. & Sonwa, D.** 2011. *Cocoa intensification scenarios and their predicted impact on CO 2 emissions, biodiversity conservation, and rural livelihoods in the Guinea rain forest of West Africa.* Environmental Management, 48(2): 307–321.; **Kroeger, A., Koenig, S., Thomson, A. & Streck, C.** 2017. *Forest and Climate-Smart Cocoa in Côte d'Ivoire and Ghana, Aligning Stakeholders to Support Smallholders in Deforestation-Free Cocoa.* In: The World Bank. Washington, DC. Cited 2 August 2022.; **Ngoma, H., Angelsen, A., Carter, S. & Roman-Cuesta, R.M.** 2018. *Climate-smart agriculture: Will higher yields lead to lower deforestation?* Bogor, Indonesia.; **Zhao, C., Liu, B., Piao, S., Wang, X., Lobell, D.B., Huang, Y., Huang, M. *et al.*** 2017. *Temperature increase reduces global yields of major crops in four independent estimates.* Proceedings of the National Academy of Sciences, 114(35): 9326–9331.

[1] Forthcoming FAO "From reference levels to results reporting" publication.

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Efforts to bridge forests and agriculture are also increasing in the forest and landscape restoration agenda; 69 governments have pledged voluntary reforestation commitments by 2030 under the Bonn Challenge, which aims to restore 350 million ha of degraded and deforested lands globally by 2030, and regional restoration initiatives have been spurred in Latin America (Initiative 20x20) and Africa (the African Forest Landscape Restoration Initiative (AFR100). Action to protect the world's largest tropical peatlands is embedded in the Brazzaville Declaration, signed in 2018 by the Republic of the Congo, the Democratic Republic of the Congo and Indonesia.

REDD+ finance and other sources of climate finance can be a strategic source of complementary funding for the cross-sectoral and intergovernmental actions at the national and subnational level that are necessary to achieve better synergies between agriculture and forests. Such financing – particularly for countries able to access RBPs - has enabled "producer countries" to promote stronger forest governance and sustainable agricultural production practices. This includes agroforestry and silvopastoralism, fire management techniques, and meeting emerging standards for commodity production. RBPs and other sources of climate finance have enabled countries, such as Argentina and Colombia, to funnel benefits to local governments and communities for on-the-ground actions.

Further actions are needed to ensure REDD+ interventions are aligned with agricultural development objectives and producer realities (Box 5). Countries that produce, and in some cases process, agricultural commodities associated with forest conversion may risk reducing their market niche and export revenue if they do not meet increasingly stringent market demands introduced by "consumer countries", including due diligence measures for embodied deforestation. Increased and sustained technical and financial support is required to respond to this challenge. It should target small- and medium-size producers, as well as local micro-, small- and medium-sized enterprises (MSMEs), who face greater capacity constraints to effectively meet forthcoming trade regulations and due diligence standards set by "consumer countries". "Consumer countries" should consider "producer countries"' national priorities and REDD+ processes when developing their own initiatives to support a transition to more sustainable agrifood systems, and aim to avoid further fragmentation of forest governance and inconsistencies among initiatives to eliminate deforestation from agricultural value chains (Weatherley-Singh and Gupta, 2018).

Box 5
The producer perspective

Producers are at the heart of food and land use systems and are key to delivering on the promise of decoupling deforestation from agricultural commodities. Their decisions for converting or protecting forestland respond to direct and indirect drivers or opportunities. In particular, global and local economic, social and bio-physical circumstances emerge as major drivers for forest conversion, indirectly influencing local actions (Geist and Lambin, 2002). Agricultural expansion to produce crops or livestock can be viewed by some farmers as a route out of poverty (Lyons-White and Knight, 2018). For many small-scale farmers, forest conversion is often a result of compounding factors of soil depletion and land degradation, including effects from over-application of inputs, low incomes, multifaceted aspects of climate change, insecure tenure rights and limited access to finance and technical assistance for the adoption of adequate technologies and practices (IFC, 2014; Chagas *et al*., 2018; Stabile *et al*., 2020). Another critical factor is the predominance of technical and financial support that often subsidizes high agrochemical input agriculture, and credit schemes and loans that provide little or no support for preventing deforestation – or even promote actions counter to removing conversion from agricultural practices (FAO, UNDP and UNEP, 2021). For risk-averse medium- and large-scale producers responding to acute changes in markets and incentives, purchasing and converting forestland is often cheaper than investing in productivity on existing cropland or pasture (Stabile *et al*., 2020). In areas where agricultural products are exported to international markets, technological advances that free up labour or increase profits from lowland agriculture may be used for agricultural extensification, such as cattle ranching (Angelsen, 2010; Ngoma *et al*., 2018). Forests are often seen as having little or no commercial value, whether due to complex legal requirements for legal and sustainable logging, lack of markets for non-timber forests products or weak incentives for provision of environmental services, including carbon sequestration.

The extent and security of tenure rights, including customary rights, and how these rights are codified and respected, often influence how farmers use their land. Private and collective tenure rights over forested areas, for instance under community-based forest management, are seen as a key enabling condition for the promotion of forest protection. Likewise, tenure security over farm lands is shown to increase incentives for farmers to invest in their lands and reduce deforestation (Kubitza *et al*., 2018; Antwi-Agyei *et al*., 2015). The following approaches can all contribute to secured collective tenure rights and tenure security for farmers, leading to positive outcomes for forests: harmonized support from both the forestry and agriculture sectors to ensure rights are formalized and protected, granting rights to producers to plant and benefit from trees as high-value resources, and enabling access to technical and financial support for agricultural practices that preserve forests (Aggarwal *et al*., 2021).

Despite their importance, producers are not yet sufficiently engaged in, or supported to, transition to more sustainable agricultural practices. Price premiums for sustainable agriculture should incentivize farmers to improve practices, but these have yet to materialize at a rate that can effect widespread change (Carodenuto, 2019; Taylor and Streck, 2018). Existing production incentives that effectively encourage expansion of agricultural land also reduce the financial viability of practices that avoid forest conversion from production, incentives for which can be lower or inexistent. Across most agricultural commodities associated with forest conversion, producers tend to receive the least amount of revenue in comparison to other value chain actors, and are often restricted by investment capacity, and a willingness to adopt new practices due to perceptions or experiences of unfair pricing and compensation (Larsen *et al*., 2018). In addition, local-level producers often lack the skills or resources to formulate village-level cooperatives or farmers' groups by themselves, which could leverage their capacity to negotiate with governments and corporates/buyers, and even, to access finance and markets for more sustainable products. If not well coordinated by the public sector, improved practices promoted by market-based measures may be adopted only by producers who can most easily comply; uncoordinated measures could undermine other goals that are more difficult to comply with, or producers who face greater barriers to compliance (Lambin *et al*., 2018). Support is needed for those less likely or able to comply. Transparency and trust across value chain actors can promote producer uptake of more sustainable practices and engagement with downstream actors promoting more sustainable practices (Garrett *et al*., 2021; Thorpe, 2018; Gardner *et al*., 2018).

Source: **Aggarwal, S., Larson, A., McDermott, C., Katila, P. & Giessen, L**. 2021. Tenure reform for better forestry: an unfinished policy agenda. *Forest Policy and Economics*, 123.; **Angelsen, A**. 2010. Policies for reduced deforestation and their impact on agricultural production. *Proceedings of the National Academy of Sciences*, 107(46): 19639–19644. ; **Antwi-Agyei, P., Dougill, A. & Stringer, L.** 2015. Impacts of land tenure arrangements on the adaptive capacity of marginalized groups: The case of Ghana's Ejura Sekyedumase and Bongo Districts. *Land Use Policy*, 49: 203–212.; **Carodenuto, S.** 2019. Governance of zero deforestation cocoa in West Africa: New forms of public–private interaction. *Environmental Policy and Governance*, 29(1): 55–66.; **Chagas, T., Streck, C., Galt, H., Zwick, S., Schulte, I., Kroeger, A. & Thompson, A.** 2018. Impacts of supply chain commitments on the forest frontier. *Forest Trends.;* **FAO, UNDP and UNEP**. 2021. *A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems.* Rome, FAO.; **Gardner, T.A., Benzie, M., Börner, J., Dawkins, E., Fick, S., Garrett, R., Godar, J. *et al.*** 2019. Transparency and sustainability in global commodity supply chains. *World Development*, 121: 163–177.; **Garrett, R.D., Levy, S.A., Gollnow, F., Hodel, L. & Rueda, X.** 2021. Have food supply chain policies improved forest conservation and rural livelihoods? A systematic review. *Environmental Research Letters,* 16.; **Geist, H.J. & Lambin**, E.F. 2002. Proximate Causes and Underlying Driving Forces of Tropical Deforestation: Tropical forests are disappearing as the result of many pressures, both local and regional, acting in various combinations in different geographical locations. *BioScience*, 52(2): 143–150.; **IFC.** 2014. Access to Finance for Smallholder Farmers Learning from the Experiences of Microfinance Institutions in Latin America. In: *The World Bank*. Washington, DC. Cited 12 September 2022.; **Kubitza, C., Krishna, V.V., Urban, K., Alamsyah, Z. & Qaim, M.** 2018. Land property rights, agricultural intensification, and deforestation in Indonesia. *Ecological Economics*, 147: 312–321.; **Lambin, E.F., Gibbs, H.K., Heilmayr, R. Carlson, K.M. Fleck, L.C. Garrett, R.D. le Polain de Waroux, Y. *et al*.** 2018. The role of supply-chain initiatives in reducing deforestation. *Nature Change*, 8: 109–116.; **Larsen, R.K., Osbeck, M., Dawkins, E., Tuhkanen, H., Nguyen, H., Nugroho, A., Gardner, T.A. *et al.*** 2018. Hybrid governance in agricultural commodity chains: Insights from the implementation of "No Deforestation, No Peat, No Exploitation' (NDPE) policies in the oil palm industry. *Journal of Cleaner Production,* 183: 544–554.; **Lyons-White J. & Knight, A.T**. 2018. Palm oil supply chain complexity impedes implementation of corporate no-deforestation commitments. *Global Environmental Change*, 50: 303–313.; **Ngoma, H., Angelsen, A., Carter, S. & Roman-Cuesta, R.M.** 2018. *Climate-smart agriculture: Will higher yields lead to lower deforestation?* Bogor, Indonesia.; **Stabile, M.C., Guimarães, A.L., Silva, D.S., Ribeiro, V., Macedo, M.N., Coe, M.T., Pinto, E. *et al.*** 2020. Solving Brazil's land use puzzle: Increasing production and slowing Amazon deforestation. *Land Use Policy*, 91:.; **Taylor, R. & Streck, C.** 2018. The elusive impact of the deforestation-free supply chain movement. WRI working paper.; **Thorpe, J**. 2018. Procedural Justice in Value Chains Through Public–private Partnerships. *World Development,* 103: 162–175.

1.2.3.1 Integrated landscape approaches

An estimated 43 million ha of forest were lost in just 24 locations identified as having high concentration of deforestation or severe forest degradation from 2004–2017 (Pacheco *et al.*, 2021). Across these high deforestation risk locations, large- or small-scale agriculture, or both, were a contributing factor. In recognition of the concentration of deforestation risks in specific locations, several initiatives targeting specific jurisdictions or landscapes have emerged in recent years. Globally, dozens of subnational jurisdictions use landscape approaches that integrate complementary objectives and actions embedded in REDD+ strategies and sustainable supply chains with other domestic policies and finance (Fishman *et al.*, 2017; Boyd *et al.*, 2018; Stickler *et al.*, 2018a; Umunay *et al.*, 2018; von Essen and Lambin, 2021). These include, inter alia, government-led subnational jurisdictional strategies and investment plans for REDD+ and low-emissions development and green growth strategies developed in the framework of the Governors' Climate and Forests Task Force, of which 35 tropical subnational jurisdictions are members. All made formal commitments to reducing deforestation in their jurisdictions and have taken concrete actions to implement pledges (Stickler *et al.*, 2018b).

Local level planning, including spatial mapping, is underway in areas where national and subnational legal and regulatory frameworks enable the empowerment of land use decisions and tools to be developed at the local level. Finally, in some places, such as Indonesia and Brazil, jurisdictional sourcing is being tested as a form of public-private-producer partnership (Boshoven *et al.*, 2021). Some downstream retailers and buyers have committed to preferential sourcing from landscapes or jurisdictions that meet criteria for responsible production (Stickler *et al.*, 2018b); SourceUp, a platform hosted by the Sustainable Trade Initiative (IDH), emerged to connect areas and producers committed to responsible production with companies looking to source products to help meet sustainability objectives. While partnerships are common, contractual agreements ensuring technical, financial and capacity development support from private actors have been limited (Stickler *et al.*, 2018a).

Integrated landscape approaches[2] are emerging as a logical paradigm to achieve production landscapes where synergies between agriculture and forests are maximized, and trade-offs minimized (Minang *et al.*, 2015; Denier *et al.*, 2015; Sayer *et al.*, 2013). Inherently cross-sectoral, they seek to coalesce partners, provide directionality and facilitate action within an agreed framework to meet multiple needs and balance trade-offs within a specific jurisdiction or landscape at the subnational level (Minang *et al.*, 2015; Denier *et al.*, 2015; Reed *et al.*, 2019). These approaches are inherently complex and can take many forms – or names – based on the local context (Sayer *et al.*, 2013). They may be relevant at a range of scales to cover a subnational jurisdiction based on administrative boundaries, ecosystem or cultural interlinkages, or similarities in agricultural production systems.

Integrated landscape approaches may emerge from domestic policy reforms or provide additionality to existing initiatives and can be coupled with other interventions in the forest or agriculture sector, such as reducing forced/child labour, reducing pesticide use and expanding protected area coverage. Capacity building and awareness raising is likely to be needed within any approach; this may focus not only on technical extension support during implementation, but on capacity support for a range of stakeholders to effectively participate in the design and implementation of the approach and its interventions.

The vast majority of national REDD+ strategies and investment plans include integrated landscape approaches and improved agriculture and land-use practices; they recognize to halt deforestation, it is vital to go beyond sustainable production, ensuring to protect landscapes with forests and trees. Integrated landscape approaches should recognize the particular ecological, economic and cultural context of the area and the objectives of different stakeholders (Box 6). They must take into account conflicting or overlapping demands and objectives for the same area of land and seek to find synergies to reduce the likelihood of conflict; this can ensure the best chance for long-term success, and the sustained provision of multiple values and services to diverse actors over time (Reed *et al.*, 2019).

Integrated landscape approach interventions will vary by landscape; in the context of reducing deforestation, they often cover four categories:

- **Produce:** Agricultural productivity is prioritized across the jurisdiction or landscape through interventions boosting production (in quantity, quality or profitability) while reducing negative impacts on land, forest and water resources, especially land use change.
- **Protect:** Natural forests are priority ecosystems for protection. Agricultural expansion into forest land is discouraged but can be considered in the local context according to land use planning.
- **Restore:** Forests and degraded agricultural land are restored to maximum potential to compensate forest loss, mitigate land degradation (a major factor in driving deforestation) and re-establish the productive capacity of degraded agricultural land.
- **Include:** Indigenous Peoples and local communities, small-scale farmers, women and youth are key actors, and their inclusion is essential for production, protection and restoration, as well as and social and economic development objectives.

[2] Within this paper, integrated landscape approaches directly refer to initiatives or landscape management structures that combine REDD+ finance or strategies, private sector commitments and some form of subnational jurisdictional approach into a common agenda and set of actions.

Box 6
Territorial Planning in Paragominas, Brazil

Learning from the field: Territorial planning is an important tool for sustainable agricultural intensification and forest restoration in Paragominas, a municipality in Pará State, in Brazil's Eastern Amazon. The municipality conducts microzoning, based on soil suitability mapping, to inform either sustainable intensification, including the use of mechanization, crop-livestock integration, and silvopastoral systems, or forest landscape restoration, through forestry integrated with pasture management and natural regeneration, on land unsuitable for crop or livestock production. While Pará State is known for its high deforestation rates, strong law enforcement and command-and-control measures since 2008, together with strategic territorial planning in Paragominas, has allowed forest cover to largely remain stable in recent years, while economic growth and social progress have increased. Through the TerrAmaz project, the municipality is in the process of developing an innovative "territorial certification" system, where locally conceptualized criteria for environmental and social sustainability in the management of agricultural value chains, together with third party monitoring and verification by NGOs, will help Paragominas qualify for IDH's "SourceUp" platform. This model, grounded in Pará state's REDD+ policy, is foreseen to ensure the responsibility of agricultural products produced in Paragominas and enhance its access to finance.

Source: Brandao, F., Piketty, M-G., Poccard-Chapuis, R., Brito, B., Pacheco, P., Garcia, E., Duchelle, A. *et al.* 2020. *Lessons for Jurisdictional Approaches From Municipal-Level Initiatives to Halt Deforestation in the Brazilian Amazon*. Frontiers in Forests and Global Change, 3.

1.2.4 Private sector commitments and action

In light of increasing awareness of the impact of agricultural commodities on forest loss and climate change, and recognition of associated supply chain and reputational risks, private sector entities have acted to reduce deforestation from agricultural commodity supply chains in recent years. Approximately 400 companies were represented when the Consumer Goods Forum (CGF) Board passed a 2010 resolution to achieve net zero deforestation in cattle, soy, palm oil, and pulp and paper supply chains by 2020 (Forest Trends, 2019). Financial institutions followed suit – 12 global banks signed onto the Banking Environment Initiative's Soft Commodities Compact in 2014 to "help transform soft commodity supply chains and help clients achieve zero net deforestation by 2020" (CISL, 2020). Major companies have made individual commitments and adopted sourcing policies and traceability systems to demonstrate business operations and supply chains are "*deforestation-free*", and dozens of companies endorsed the NYDF. Company approaches may include, among others, preferential sourcing policies, No Deforestation, No Peat, No Exploitation (NDPE)[3] policies, business codes of conduct, adoption of industry-wide standards, as well as participation in certification schemes and market exclusion measures such as restricting market access for illegally or unsustainably produced agricultural commodities.

Private entities increasingly recognize the costs of forest-related risks, valued at more than USD 79.22 billion in 2021 by 211 companies producing or sourcing commodities associated with deforestation (Accountability Framework and CDP, 2022). Until recently, there was varied impetus from downstream actors to prioritize removing deforestation from their agricultural supply chain sourcing and operations, but evidence shows this dynamic is shifting significantly. Private sector progress on meeting commitments to eliminate deforestation in supply chains is growing: 93 percent of companies using or producing agricultural commodities associated with deforestation disclosed through CDP in 2020 acted on at least one of 15 Key Performance Indicators (KPIs) to tackle deforestation (CDP, 2021). Further, new commitments are emerging; for example, the Forest Positive Coalition, launched under the CGF in 2020, was joined by 21 consumer goods retailers and manufacturers with a combined market value of nearly USD 2 trillion and aims to improve industry wide action with measurable KPIs through commodity-specific roadmaps (CGF, 2021a).

There has been an emergence of reporting requirements, best practices and guidance for private companies and financial institutions. Among them, the OECD–FAO Guidance for Responsible Agricultural Supply Chains has become a key reference (Box 7). In some countries, governments are mandating private sector entities establish due diligence systems that address social and environmental risks, such as deforestation, which may be referred to either explicitly or implicitly, through mention of natural resources and environmental impacts in business conduct. Land use is gaining ground in corporate reporting, with guidance being developed for companies to develop science-based targets to reduce emissions from forest, land and agriculture activities and to report on land sector emissions and removals in their GHG inventories by multistakeholder partnerships, the Science-Based Targets initiative (SBTi) and the Greenhouse Gas Protocol (GHG Protocol), respectively. Frameworks and investors are increasingly asking the private sector to disclose progress on environmental, social and governance (ESG) issues, and in particular, their exposure to climate and deforestation risks (e.g., CDP's questionnaires on forests, and the Global Reporting Initiative (GRI) standards). Investor-led voluntary principles exist or are in development, such as the Principles for Responsible Investment (PRI), the Task Force on Climate-Related Financial Disclosures (TCFD) and the Task

[3] Specific to the palm oil sector, NDPE commitments are designed to prevent new deforestation or development on peatlands for agricultural purposes, and avoid exploitation and promote participation of communities

Force on Nature-Related Financial Disclosures (TNFD). Forestry and agriculture decoupled from deforestation are increasingly seen as opportunities for businesses to fund restoration and conservation; institutional investment into forestry increased from USD 10–15 billion in the early 2000s to over USD 100 billion by 2019 (PRI, 2019; WEF, 2021a). Private sector collaboration in integrated landscape approaches and public-private-producer partnerships is on the rise (Reed *et al.*, 2020).

Despite renewed interest of financing institutions and downstream actors in achieving responsible supply chains that exclude deforestation, they have faced challenges in doing so, including a mismatch of timelines with operational and political realities. Some retailers have faced challenges or delays in effectively operationalizing strategies, particularly when met with complex sourcing arrangements involving indirect sourcing from multiple producers, as well as where critical midstream actors, such as traders, processors and refiners, are involved (NYDF Assessment Partners, 2019). Private sector leverage to improve producer practices throughout their supply chains may be constrained by a status quo that limits law enforcement or benefits the local elite (Larsen *et al.*, 2018).

Box 7
OECD–FAO Guidance for Responsible Agricultural Supply Chains

In 2016 the Organisation for Economic Co-operation and Development (OECD) and FAO launched the OECD–FAO Guidance for Responsible Agricultural Supply Chains (OECD–FAO Guidance) to help enterprises observe existing frameworks for responsible business conduct, including the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises, while addressing the particularities of risk in agricultural supply chains. Since its launch, the OECD–FAO Guidance has become the leading agricultural sector reference for responsible business conduct in the agriculture sector. It provides guidance for companies on how to adopt relevant corporate policies, identify and reduce social and environmental risks, monitor and report on results and remediate possible negative impacts through a five-step framework for risk-based due diligence. The OECD–FAO Guidance highlights a wide array of risks, including labour rights, natural resource depletion, animal welfare, land tenure rights, environmental protection, food security and human rights, among others. In recognition of the risks posed to companies by forest conversion, a OECD–FAO Business Handbook on Deforestation, Forest Degradation and Due Diligence in Agricultural Supply Chains is in development.

A pilot project explored how the OECD–FAO Guidance was implemented by enterprises responsible for producing, transporting and transforming a wide range of agricultural food and non-food commodities, including bananas, beef, cocoa, cotton, dairy products, palm oil, soy, sugar and tobacco. One participating company that used the guidance to identify and reduce impacts on deforestation in its sustainable palm sourcing initiatives highlighted that implementing the due diligence approach, coupled with the use of technology such as satellite monitoring, can provide an important means of achieving its commitment to sourcing 100 percent "responsible" palm oil (OECD/FAO, 2019). Another participating company introduced a mobile application to improve the way data are collected, measure sustainability indicators, reduce red tape and optimize the time field technicians spend on monitoring. In particular, the app helped identify several issues related to deforestation and labour standards in the supply chains and informed mitigation actions to tackle them (OECD/FAO, 2019).

Source: OECD/FAO. 2019. *OECD–FAO Pilot project on the implementation of the OECD–FAO Guidance for Responsible Agricultural Supply Chains: Final Report*. Paris, OECD.

1.2.5 Sectoral standards and certification schemes

Both the public sector and private companies - or groups of companies - can introduce sectoral standards to encourage the adoption of improved practices throughout agricultural and forest product value chains (Lambin *et al.*, 2018). Standards can be set out in national regulations, like organic, voluntary certification schemes, such as Rainforest Alliance and Fairtrade, and international or regional bodies, including the International Organization for Standardization – ISO or African Regional Standards. Sectoral standards can include incentives, usually promoted through voluntary certification measures for specific commodities, as well as market-based measures such as sanctions (Lambin *et al.*, 2018).

Sustainability standards and certification schemes are often used as instruments to meet private sector commitments linked to deforestation, together with operational guidelines, corporate codes of conduct for compliance and internal traceability mechanisms (Lambin *et al.*, 2018; Scherr *et al.*, 2017). More than 85 percent of companies with commitments to reduce deforestation in the palm oil, soy and cattle supply chains rely on third-party certification for sourcing; companies facing deforestation risks often associate certification with credibility (Lambin *et al.*, 2018; Climate Focus, 2016). Several international certification schemes exist that cover single or multiple commodities, with the largest area of agricultural certification covered by single-commodity standards (Meier *et al.*, 2022).

For livestock, the Global Roundtable for Sustainable Beef (GRSB) sets out principles and criteria for a common conceptual understanding on sustainable beef; however, the initiative does not constitute as a certification standard, monitoring system or verification programme (GRSB, 2014). For soy, the Round Table on Responsible Soy (RTRS) and Proterra certify the greatest production area (Willer *et al.*, 2019). RTRS certification includes production practices and chain of custody standards, verifying the status of the product throughout the entire process, from farm to retailer, and companies that seek certification undergo third party verification. The RTRS standard states that no "natural land" should be converted after June 2016, and a geospatial map included in the standard highlights specific areas where a High Conservation Value (HCV) Area assessment (Box 8) is required prior to expansion (RTRS, 2021). For palm oil, the Roundtable on Sustainable Palm Oil (RSPO) is the most prominent certification body for production and chain of custody standards (Voora *et al.*, 2019; Willer *et al.*, 2019). RSPO certification is designed for producers, mills and supply chain companies that meet the standards set out in the nationally adapted Principles and Criteria; they must undergo third party verification to obtain certification. Since 2018, the RSPO Principles and Criteria have included High Conservation Value-High Carbon Stock approach (HCV–HCSA) assessments order to better preserve natural ecosystems (RSPO, 2018).

Box 8
High Conservation Value (HCV) and High Carbon Stock (HCS) forests

Of the companies implementing "deforestation-free" commitments, a focus on High Conservation Value (HCV) and High Carbon Stock (HCS) forests is increasingly included in procurement and investment policies to ensure preservation of the ecosystem service function, including carbon sequestration and biodiversity conservation (Garrett *et al.*, 2019). The HCV approach was first developed by the Forest Stewardship Council (FSC) and adopted in 1999. Its three-step process is designed to ensure six social, ecological and cultural values are maintained or enhanced in production landscapes; these are: 1) species diversity, 2) landscape-level ecosystems, 3) rare ecosystems/habitats, 4) critical ecosystem services, 5) community livelihood needs and 6) cultural values. The HCS approach was developed by palm oil company Golden-Agri Resources Limited (GAR) when, facing limitations with the HCV approach and trying to ensure a no deforestation footprint, it collaborated with Greenpeace and The Forest Trust (TFT) to develop a new methodology for identifying high carbon stock areas. Since its launch in 2013, the HCS approach (HCSA) has provided a methodology to distinguish "viable" forest areas from degraded land with low biodiversity and carbon values, and to identify community lands. The HCSA incorporates many aspects of the HCV; since 2017, guidance was released for conducting integrated HCV- HSCA assessments. Depending on the criteria, between 34 and 74 percent of forests can be considered HCV, HCS and/or tropical forests on peatlands (Leijtam *et al.*, 2020).

Source: Garrett, R.D., Levy, S., Carlson, K.M., Gardner, T.A., Godar, J., Clapp, J., Dauvergne, P. *et al.* 2019. Criteria for effective zero-deforestation commitments. *Global environmental Change*, 54: 135 –147.; **Leijtam, F.C., Sim, S., King, H. & Verbung, P.H.** 2020. Which forests could be protected by corporate zero deforestation commitments? A spatial assessment. *Environmental Research Letters*, 15.

Rainforest Alliance and UTZ, which merged in 2018, are examples of multicommodity standards, covering commodities including palm oil, cocoa and coffee; they prioritize set-aside areas of forest and utilize an HCV approach. Several national certification schemes have been developed, such as the Indonesian Sustainable Palm Oil (ISPO) Standard and the Malaysian Sustainable Palm Oil (MSPO) standards to advance sustainable production and conserve biodiversity (Voora *et al.*, 2019). Despite significant emphasis from the private sector, the coverage of voluntary certification standards for major agricultural commodities associated with forest conversion remains relatively low (*Table 1*). In addition, companies may hold both certified and non-certified assets, complicating clarity on the application of certification standards (Heilmayr, Carlson and Benedict, 2020).

Table 1

Commodity certification schemes or standards as share of cultivated land by commodity

Commodity	Certifications / Standards	Global Coverage in 2019	Chain of custody?	Third party verification?	Social commitment?
Cocoa	ISO 34101 Sustainable and traceable cocoa	22.7-41.6%	Partially	Internal and/or external audit	✓
	Voluntary certifications (e.g., Fairtrade, Rainforest Alliance)		✓	✓	✓
	Regional standards (e.g., African Regional Standard)				
	UTZ Certified		✓	✓	✓
Coffee	The Common Code for the Coffee Community (4C)	16.1-34.5%	22.7-41.6%	22.7-41.6%	22.7-41.6%
	Voluntary certifications (e.g., Fairtrade, Rainforest Alliance, UTZ)		✓	✓	✓
	UTZ Certified			✓	✓
Lifestock	ISO 34101 Sustainable and traceable cocoa		GRSB is not a certification, rather principles and criteria to support sustainable beef production.		
Oil palm	Roundtable on Sustainable Palm Oil (RSPO)	10.9-11.2%	✓	✓ Accredited third-party	✓
	Rainforest Alliance		✓	✓	✓
Soybeans	Round Table on Responsible Soy Association (RTRS)	1.1.5-2.4%	✓	✓	✓
	The ProTerra Standard				

Source: Meier, C., Sampson, G., Larrea, C., Schlatter, B., Bermudez, S., Dang, D. & Willer, H. 2022. *The State of Sustainable Markets 2021: Statistics and Emerging Trends*. Geneva, Switzerland, International Trade Centre.

Certification schemes aim to incentivize farmers to comply by promoting a price premium. However, this price premium often fails to materialize, or is insufficient to compensate producers for the costs required to upgrade management practices and for verification. For this reason, many retailers have begun to emphasize market access and improved farm management rather than price premiums (Lambin *et al.*, 2018). For markets such as cocoa, where many producers live in absolute poverty, premiums offered by schemes such as Fairtrade may not provide an income sufficient to lift them out of poverty – although yield increases can contribute to income improvements (Carodenuto, 2019). In some countries' cattle and soy sectors, there is little evidence to suggest companies are adequately supporting producers to adopt more sustainable practices (Haupt *et al.*, 2018). The high costs associated with certification often result in farmers whose practices fulfil the criteria for certification (used by many companies as a proxy for "deforestation free") remaining uncertified due to an inability or unwillingness to pay, and thus unable to benefit from certified value chains (Boucher and Elias, 2013; Lambin *et al.*, 2018; FAO, 2018b).

Crucially, certification schemes for specific commodities can only have an impact on their own supply chain; deforestation can be displaced between commodity supply chains, even within the same landscape. The impact on reducing deforestation is sometimes contested, due to limited uptake of certification across all actors in the supply chain, and in the design of the schemes, like retroactively applying criteria. For example, since 2009, an estimated 14 432 km^2 of forest loss has occurred in palm oil concessions in Kalimantan, Indonesia; low uptake of RSPO certification managed to avoid an estimated maximum of less than two percent of that total area (Heilmayr, Carlson and Benedict, 2020). The uptake of voluntary certification may increase, should "producer" and "consumer" countries consider it to be a relevant tool, at least partially, to demonstrate compliance with emerging due diligence approaches and regulatory measures.

Market exclusion measures have emerged in parallel to certification schemes, as an approach to implementing market requirements to ensure legal compliance through sanctions and moratoria; these are often industry-led but can be facilitated or led by government (Lambin *et al.*, 2018). Examples include the Brazilian Cattle Agreements, the Brazil Soy Moratorium and the moratorium on new concessions for palm oil and timber plantations on peatland in Indonesia. Cattle agreements were introduced in Brazil in 2009, with the largest meatpacking companies signing legally binding "Terms of Adjustment Conduct" to ensure compliance with the then-future Forest Code, through the

national Rural Environmental Registry (*Portuguese acronym* CAR) (Pacheco *et al.*, 2017). By July 2016, 75 percent of legal exportation-focused slaughterhouses in the Amazon were covered by these agreements (Alix-Garcia and Gibbs, 2017). Their impact, however, has had no effect on forest cover loss overall; as early registrants to the CAR reduced deforestation, the latter registrants offset this gain (Alix-Garcia and Gibbs, 2017). Slaughterhouses also continued to locate their operations in areas of high deforestation; despite the commitment of Brazil's three largest meatpacking companies to stop purchasing directly from ranches clearing more forest than legally permitted, intermediaries were still able to sell cattle to slaughterhouses from a property not registered in Brazil's Rural Environmental Registry, or CAR, by trading through a CAR registered property (Alix-Garcia and Gibbs, 2017). The Soy Moratorium was a multistakeholder initiative that called for companies to avoid purchasing soy from producers in Brazil who used land deforested after 2006. From 2001–2014, pre-moratorium forest-to-agricultural land conversion rates for cultivating soy were more than twice the rate after implementation, where the deforestation rate dropped to a fifth of its previous level (Kastens *et al.*, 2017). Much of this success can be attributed to the involvement of members of the Brazilian Association of Vegetable Oil Industries and the Association of Cereal Exporters in Brazil, responsible for more than 90 percent of soy exports from the Amazon, in the moratorium. The involvement of both these groups supported a consistent message and minimized the risk of parallel markets developing (zu Ermgassen *et al.*, 2020). However, there have been concerns of "spillover" effects on the expansion of soy production in other natural ecosystems within Brazil and in neighbouring countries (Fehlenberg *et al.*, 2017).

1.2.6 Data transparency, monitoring and traceability

One of the main factors shedding light on the embodiment of deforestation in the trade of commodities commonly associated with deforestation is enhanced data transparency and accessibility; this includes tools and datasets hosted by the Food and Agriculture Organization of the United Nations (FAO), such as the Global Forest Resources Assessments (FRA), FAOSTAT and the Food and Agriculture Microdata (FAM) Catalogue, as well as open-source tools such as OpenForis and remote sensing tools, like the System for Earth Observation Data Access, Processing, and Analysis for Land Monitoring (SEPAL), and the Hand-in-Hand geospatial platform (Box 9).

Box 9
FAO open access resources for forestry- and agriculture-related data

FAO has developed several open access resources for the collection, analysis and dissemination of forestry and agriculture related data. Information on the extent of countries' forest resources, condition, management and uses has been compiled in the Global Forest Resources Assessments (FRA) at five to ten year intervals since 1946; an online platform provides access to national-level data and metadata reported. FAO developed Open Foris, a set of free and open-source tools for forest-related data collection, analysis and reporting, and SEPAL, a cloud computing platform facilitating access and processing of satellite data. FAOSTAT collated and provided access to food and agricultural data from for more than 245 countries and territories since 1961. The Food and Agriculture Microdata (FAM) Catalogue contains an inventory of datasets collected through farm and household surveys that include information related to agriculture, food security and nutrition. The open access Hand-in-Hand geospatial platform provides geospatial data across agriculture, fisheries and forestry, including food security indicators and agricultural statistics. In addition, FAO and the Basque Centre for Climate Change (BC3) are developing a novel database based on Multiregional Input-Output (MRIO) techniques and FAO datasets, including the new Supply Utilization Accounts, production and trade statistics for agricultural products. This database tracks resource flows along the global supply chain and provides detailed information on the production, transformation, bilateral trade, and final use of more than 650 agricultural products and 20 wood products in 181 countries, for the periods 1997–2010 and 2010–2020.

Source: Authors' own elaboration.

Global investment in making statistical and spatial data publicly available has, in large part, enabled the advancement of data transparency tools, such as Global Forest Watch and Trase, which compile and analyse information across a range of commodities, including beef, soy, palm oil, and cocoa; the former focuses on spatial mapping, and the latter compiles publicly available supply chain data for traded commodities for investors, governments and civil society, to track trade flows and relate them to deforestation. The availability of data, together with civil society advocacy, has led to increased global awareness of trade flows of commodities associated with deforestation, including among investors, supply chain actors, policymakers, and consumers. The clear attribution of deforestation to global trade has encouraged many "consumer country" governments to take action to reduce their environmental footprint from imported deforestation. Though much progress has been made, the quality of commodity data from global information products is often not optimal at national scale (Harris *et al.*, 2018, Sandker *et al.*, 2021), stressing the importance of "producer countries"' efforts to assess and verify data on deforestation and its causes.

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"Producer country" governments have made significant strides in advancing their information systems, including in the land use and forestry sector. REDD+ readiness phase played a significant role in this progress. This has been supported in large part by efforts to increase the reliability and transparency of data for international reporting, including on forest reference emission levels to the UNFCCC (Ramírez *et al.*, 2022). National forest monitoring systems (NFMS) witnessed great progress over the past 15 years, with substantial investment made and capacities to implement in more than 50 countries, often supported under REDD+ initiatives to ensure the credibility of measurement, reporting and verification (MRV) of REDD+ results and access to results-based finance (Neeff and Piazza, 2019; Nesha *et al.*, 2021; Sandker and Neeff, 2020; UN-REDD Programme, 2022b). The number of countries monitoring forest area using remote sensing, at good to very good capacities, increased from 55 in 2005 to 99 in 2020 (Nesha *et al.*, 2021). Likewise, the number of countries with good to very good national forest inventory (NFI) capacities increased from 48 in 2005 to 102 in 2020 (Nesha *et al.*, 2021).

NFMS typically include data from satellite land monitoring, NFIs, which use biophysical data collected in the field, and data from national GHG inventory systems. High-resolution satellite imagery and advancements in near-real time monitoring and remote sensing tools tracking land use change patterns on specific production lands can complement other forms of monitoring or traceability systems for specific commodities or landscapes. Together, these have enabled more rapid technical assessments, identification of deforestation drivers and monitoring of the results of interventions to address deforestation and forest degradation. Among carbon rich ecosystems, information on peatlands is increasingly being reported by countries, often requiring the integration of peatlands into national monitoring and reporting systems, such as NFMS.

For market actors, the ability to verify the origins and production conditions of products is crucial to provide credibility and accountability to their actions to eliminate deforestation from supply chains and business operations (Lambin *et al.*, 2018). Traceability systems can support the verification process. For example, in the cocoa value chain, tracing the supply is essential in determining whether a product from Côte d'Ivoire, Ghana and Cameroon, the top cocoa producer countries in West Africa, are associated with deforestation. The first step of this process is to map cocoa farms (Carodenuto, 2019). Producer mapping is common in many traceability systems to link land use practices to specific batches of the commodity; this can encourage the private sector to make the necessary investments (Carodenuto, 2019). Yet traceability systems sometimes struggle to accommodate the complexity of supply chains, particularly for commodities with market segmentation. Palm oil traders are often unable to trace fruit bunches through third party suppliers and intra-producer trades before arrival at the mill (Lambin *et al.*, 2018; Lyons-White and Knight, 2018). Companies that rely on spot markets to cover supply shortages may struggle to prove full traceability in their supply chain, in addition to verifying production from contracted suppliers (Jopke and Schoneveld, 2018). Some of these complexities require development of more innovative traceability systems. For example, in Uruguay, ear tags are used to track individual cattle transport for sanitary reasons; this system could be used to track the land where the cattle was raised if data were made public (Alix-Garcia and Gibbs, 2017).

Key government actions to halt deforestation from agricultural commodities

2

Deforestation may take place at a micro level, but most of the factors influencing or incentivizing deforestation are outside the direct control of local actors, including demography, markets, trade and finance and other social and macroeconomic factors. Policy, regulatory and financial reforms, and sustained investment are fundamental to achieving efforts to halt deforestation driven by agriculture in the short- and long-term. **Technical and financial support from "consumer" countries to "producer" country governments and other local actors is vital** to ensure systemic change across the global agrifood system. Alignment of policies and regulations adopted by "consumer" countries for preventing deforestation embedded in imports could be further aligned to reduce complexity for "producer" countries to comply with these rules.

At the same time, **governments in "producer countries" play a key role in establishing the enabling factors** necessary to halt deforestation and to promote legal and sustainable agriculture commodity production and value chains – including for goods destined for domestic and regional markets – that avoid further encroachment on forests. The involvement of national and subnational governments is critical to increasing the positive impacts of private sector and producer initiatives to limit deforestation and forest degradation in supply chains (Garrett *et al.*, 2021). Government action can enable the success of integrated landscape approaches contributing to national climate, biodiversity and sustainable development targets, while protecting and enhancing local livelihoods and avoiding environmental degradation, enabling the land to provide food and resources for generations to come.

Halting deforestation is one of the three interrelated pathways identified to maximize forests' contribution to achieving a green recovery and tackling multidimensional planetary crises. Efforts in the areas of governance, policy coherence, stakeholder engagement and adequate financing necessary for stopping forest loss would also benefit the other two pathways - restoring degraded lands and expanding agroforestry and sustainably using forests and building green value chains (FAO, 2022c).

Key action areas where governments can contribute to halting deforestation from agricultural commodities are:

- **ensuring a conducive enabling environment,** including through developing a coherent national policy and regulatory framework ensuring multilevel coordination and engagement of local actors in integrated land use planning; facilitating vertical and horizontal multistakeholder collaboration toward a common agenda; strengthening the capacities of decentralized authorities; ensuring regulatory implementation; and enhancing tenure security and protecting the rights of the most vulnerable;

- **designing and supporting** transparent forest, land use and agricultural data and monitoring systems that enable better policymaking, as well as their institutionalization and collaboration on monitoring across sectors and scales;

- **investing in capacity development and knowledge generation for producers** through advisory and extension services, research and innovation;

- **facilitating measures and incentives for legal and sustainable agricultural value chains**, including through repurposing agricultural subsidies and other financial incentives; supporting markets for legal and sustainable projects; engaging with and seeking to align international regulatory measures and due diligence processes; mobilizing domestic and international finance and developing innovative fiscal policies to support sustainable production and responsible private investment; and reforming sectoral investment plans to integrate forests.

2.1 Establish an enabling environment and enforce legality

2.1.1 Develop and implement a coherent national policy and regulatory framework

Align sectoral policies, develop enforceable regulations and ensure institutional coordination across various levels of government

The sectoral nature of policy development, budget allocation and the everyday operation of government institutions poses a major challenge to decoupling agriculture from deforestation, and to sustainable land use more broadly. When developing national strategies for sectors ranging from agriculture to economic development to climate change, and even to health and trade, governments should assess and address the synergies and trade-offs of different policy decisions for different stakeholders and geographic areas (OECD, 2020). In many countries, inherent trade-offs, e.g., between domestic environmental policies and trade policies, can be informed by "Voluntary National Reviews" of progress towards the SDGs or by strategic environmental assessments of government plans and programmes, when mandated by national legislation (OECD, 2020). Trade-offs and implications of specific policies and incentives across both agriculture and forest sectors should be assessed before they are put into practice, and this analysis should be tailored to specific landscapes to the extent possible. The establishment or revision of sectoral and cross-sectoral strategies defining medium- to long-term objectives provides an opportunity to re-establish a national vision towards halting deforestation from agriculture commodities, informed by the latest knowledge, and to re-evaluate the allocation of public expenditures. Countries' national pathways for food systems transformation, first developed in the framework of the 2021 UN Food Systems Summit, for example, can holistically integrate relevant elements of existing REDD+, climate and biodiversity strategies, in addition to agriculture sector-specific actions needed for food security and nutrition.

Cross-institutional coordination is crucial to aligning sectoral policies and establishing coherent national frameworks. Often, departments outside of forestry or environment are not effectively engaged in the issue of deforestation, even though forest conversion is strongly related to agriculture and land use planning (Korhonen-Kurki *et al.*, 2015). Moreover, environmental and forestry ministries, which are generally made responsible for halting deforestation, are often limited in mandate to affect trends outside their jurisdiction, such as agricultural subsidies or overlapping regulations, and can differ between themselves about their functional alignment (Korhonen-Kurki *et al.*, 2015). In many countries, forest protection and rural development fall under the mandates of two separate government departments (Salvini *et al.*, 2016) and instruments to promote increased production of agricultural commodities frequently disregard possible negative impacts on forests. Coordination across sectors can send signals about government priorities and reassure both producers and private industry actors of regulatory consistency. In Ghana, for example, investment from cocoa buyers in climate-smart cocoa practices increased after coordination between the Forestry Commission and the Cocoa Board was enhanced (Fishman *et al.*, 2017).

Discrepancies in policies and regulations pose a risk both across sectors and across levels of government. In many countries striving to reduce deforestation, while progress has been made, a dichotomy of incentives is visible; governments may simultaneously promote cash crop production while also attempting to increase national forest cover and benefit from REDD+. This can present challenges for local authorities who often have to implement both policies on the ground, and can result in forest protection policies being ignored as local economic pressures dominate (Mertz and Mertens, 2017). National policy options should be developed with local needs in mind to ensure maximum effectiveness and uptake. This requires strong participation of Indigenous Peoples, communities, private sector and local government. An understanding of power dynamics across actors can facilitate more equitable outcomes. Reworking policy to eliminate deforestation from agriculture requires systems-oriented analysis and an adaptive approach to learning (Agrawal *et al.*, 2014).

Design land use planning and develop regulations with active engagement of producers, acknowledging various perspectives and needs

The development of complementary or integrated policies for agriculture and forest should be fully compatible with producer contexts, particularly those of small-scale farmers (Mertz and Mertens, 2017). A combination of policy and legal options tailored to national and local contexts is necessary for harmonizing forest and agricultural priorities in countries. Critical areas of intervention may include the regulation of forest clearing for agricultural expansion; targeted support for intensification in appropriate areas; targeted support for small-scale farmers; PES; the promotion of agro-forestry, well-defined forest and land property rights; clear land tenure systems; and frameworks for integrated land use planning and management.

Integrated land use planning is a systematic process that can support the alignment of interventions across several sectors and manage trade-offs between stakeholders on land use to formulate and implement policies based on a common agenda. Integrated land use planning can be a demanding process, and its success is dependent on a range of variables, including access to spatial data, coordination across stakeholders, and technical capacity of the organizations leading the process (García-Rangel *et al.*, 2017).

In practice, integrated land use planning consists of spatial planning combined with participatory processes that capture the knowledge and needs, activities and objectives of local- to national-level stakeholders (García-Rangel *et al.*, 2017). It can form a bridge between stakeholders to identify joint or individual actions that will achieve the common agenda, with clear advantages for local buy-in if conducted at the subnational level. This requires incorporating

the views of various stakeholders that use, have a mandate for, or hold rights over the land and its resources. Relevant maps, technical assessments and rural appraisals can be vital tools that enable a common understanding and prompt discussion between stakeholders to recognize trade-offs and agree on the most appropriate land uses and common objectives (Box 10). As a process, it can be implemented at the national to local scale, with a view to ensuring coherence across multiple levels. Land use planning may assign land for different uses, multifunctional uses (i.e., agroforestry, silvopastoralism) or different uses *over time* (Reed *et al.*, 2017). It can inform the identification of investment gaps and priorities for different areas to conduct activities, such as sustainable forest management, sustainable agriculture practices and landscape restoration (UN-REDD Programme, 2022a). Closely connecting integrated land use planning to the design of investment packages for specific landscapes or subnational jurisdictions and shared monitoring systems that can build on and support land use plans is more likely to ensure its effectiveness as a tool (UN-REDD Programme, 2022a).

Box 10
Subnational planning in Viet Nam

The Government of Viet Nam set targets within its 2020 Nationally Determined Contribution (NDC) to reduce emissions from agriculture and the Land Use, Land Use Change and Forestry (LULUCF) by a combined 5.8 percent compared to the business as usual scenario. Land planning is alluded to in the NDC and is an essential component of many of the actions identified for the agriculture and LULUCF sectors. Under the UN-REDD Programme, sub-national REDD+ planning has been successfully piloted in recent years. In 2016, Provincial REDD+ Action Plans (PRAPs) were developed and approved in five pilot provinces: Ca Mau, Binh Thuan, Ha Tinh, Bac Kan and Lao Cai. Using methodology developed by FAO, a theory of change approach was used, combining spatial analysis and maps with participatory analysis. Spatial analysis was used to prepare maps with provincial stakeholders identifying priority areas for REDD+ implementation, either in communes (administrative areas) or forest management units. Problem and solution trees were introduced to stakeholders in a series of workshops to identify drivers and barriers to specific activities such as forest restoration and improved forest management.

The PRAPs of these five pilot provinces were approved by their respective Provincial Peoples' Committees and officially launched in 2016. The PRAP concept has now been incorporated into most initiatives supporting REDD+ readiness in Viet Nam. This approach chosen by Viet Nam provides a more detailed understanding of where to implement REDD+ actions and empowered ownership of the plans to the provinces, which will be responsible for implementing them. The combined participatory and analytical approach enhanced capacity for REDD+ planning and implementation in the provinces, providing a greater understanding of the methods used to arrive at the final PRAPs, as well as greater confidence in the results.

Through the PRAP process, national policy decisions were taken to ensure smoother coordination between government agencies and to clarify policy interventions. However, greater coherence vertically and horizontally is still required across government agencies and remains a barrier to full PRAP implementation. Integration of forest plans with socioeconomic development objectives has been elusive, and alignment of incentives to match the interventions identified in the PRAPs is essential for their successful implementation.

Source: García-Rangel, S., Hicks, C., Ravilious, C., Williamson, A., & Nguyen, T.P. 2017. *Integrated land-use planning for REDD+: lessons from combining spatial analysis and participatory approaches at the sub-national level in Viet Nam.* Working Paper.; **Wurtzebach, Z., Casse, T., Meilby, H., Nielsen, M. R., & Milhøj, A.** 2019. REDD+ policy design and policy learning: The emergence of an integrated landscape approach in Vietnam. *Forest Policy and Economics,* 101: 129–139.

2.1.2 Facilitate vertical and horizontal multistakeholder collaboration toward a common agenda

Developing a shared vision around a common agenda to which a diverse set of stakeholders can relate is key to enacting systematic changes in land use arrangements (UNDP, 2020). Multistakeholder partnerships based on good practice are crucial to cross-sectoral collaboration (FAO, 2017; HLPE, 2018) and have shown to be effective in the co-creation and achievement of a common agenda for addressing deforestation at landscape and other levels, among diverse stakeholders with different values and beliefs seeking to achieve different objectives on the same parcel of land. They have been instrumental in translating the rationale for reducing deforestation to audiences external to the forest sector, and in enabling alignment of objectives of public sector, private sector, civil society, and Indigenous Peoples and local communities at local as well as global levels (Umunay *et al.*, 2018).

Governments have a vital role in convening public and private stakeholders, including producer groups and Indigenous Peoples, to provide direction for agendas articulating agriculture and forest objectives, and to enhance the legitimacy of integrated landscape approaches while ensuring the longevity of results. Leadership from the top levels of government is critical to coordinate policies that impact land use, and sends a strong signal to national and international stakeholders about government priorities (Box 11) (OECD, 2020; Furumo and Lambin, 2020). Effective governance at the national level and commitment from national level private sector actors can reduce the

likelihood of leakage of emissions across landscapes, ecosystems, or countries, as certain areas or countries move toward successfully decoupling agriculture from deforestation (Meyer and Miller, 2015). Embedding such efforts in national institutions and budgets, particularly through the enactment of legislation, can help mitigate risks from changes in political leadership – as can the development and buy-in of strong coalitions of actors (Fishman *et al.*, 2017).

Box 11
From commitment to results: The Government of Colombia catalyses change

In 2009, the Government of Colombia pledged to eliminate deforestation in the Colombian Amazon by 2020 and nationally by 2030. This high-level commitment catalysed government-led zero gross deforestation agreements in the palm oil, beef, dairy, and cocoa sectors. In total, around 13 pledges and more than 42 (35 active) multi-stakeholder initiatives across multiple levels have emerged to support the achievement of this vision. The government participates in 83 percent of multi-stakeholder initiatives, ensuring a degree of alignment, while demonstrating political leadership; this lends credibility to the government's commitments. Directionality at the national level enables the sub/non-state initiatives that have emerged to be grounded in national priorities, in the National REDD+ Strategy and the National Development Plan, as well as leveraged through public policy actions. In 2018, the Supreme Court declared the Colombian Amazonia a subject of rights and ordered the government and related bodies to take immediate action to stop deforestation in the region (STC43-60-2018, Corte Suprema de Justicia). The ongoing initiatives thus gained additional legitimacy and priority.

The leadership of the Ministry of Environment and Sustainable Development on initiatives designed to halt deforestation is linked to a close integration of sustainability in its policies, and its ability to support subnational approaches that adapt to local drivers and needs. Direct participation of the Ministry in local discussion fora is a key strategy. Government credibility and effective coordination allow for financing to be obtained from multiple sources. For example, the NFMS delivered major advancements in institutional capacity, and together with the accomplishment of other pillars of the Warsaw Framework for REDD+ and achievement of REDD+ results, enabled the government to access additional streams of REDD+ results-based finance. The Amazon Vision initiative has leveraged more than USD 370 million results-based finance from the REDD+ Early Movers (REM) Programme. Awareness among national consumers has progressively risen due to advocacy from NGOs and high-level environmental advocates, including the first Minister of Environment and a Former Director of the Humboldt Institute, a member of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). This has been strengthened with increasingly robust and transparent results from the NFMS, all broadly disseminated by national and local media.

In turn, participatory approaches and joint commitments with private sector and civil society have generated government accountability, thus significantly reducing the risk of "reversals" through changing policies and political priorities. Backbone support organisations, such as Tropical Forest Alliance (TFA), have been integral to bridging government leadership and private sector actors, who are pressed to change their practices by civil society. Effective technical and financial support is still required for smallholders, and some challenges remain in strengthening subnational authorities to effectively implement actions.

Source: Castro-Nunez, A., Charry, A., Castro-Llanos, F., Sylvester, J. & Bax, V. 2020. Reducing deforestation through value chain interventions in countries emerging from conflict: The case of the Colombian cocoa sector. *Applied Geography*, 123.; **Furumo, P.R. & Lambin, E.F**. 2020. Scaling up zero-deforestation initiatives through public-private partnerships: A look inside post-conflict Colombia. *Global Environmental Change*, 62.; **Nepstad, D., Irawan, S., Bezerra, T., Boyd, W., Stickler, C., Shimada, J., Carvalho, O. *et al.*** 2013. More food, more forests, fewer emissions, better livelihoods: linking REDD+, sustainable supply chains and domestic policy in Brazil, Indonesia and Colombia. *Carbon Management*, 4(6): 639–658.; **Otero-Durán, I. & Piniero, M.** 2019. Avances y retos en el accionar del Ministerio de Ambiente y Desarrollo Sostenible para controlar la deforestación en la Amazonía colombiana. *Espacio y Desarrollo*, 33: 91–116.

Governments can serve as partners within initiatives facilitated by organizations recognized by all actors as neutral intermediaries. In view of competing and overlapping objectives and demands from various stakeholders in the landscape, neutral intermediaries are well-placed to help bridge institutional divides, ensuring the buy-in of all stakeholders (Ros-Tonen, Reed and Sunderland, 2018). By managing and moderating conflict, these organizations can re-balance power dynamics between producer groups, other private sector actors, government, and civil society to find common-ground and achieve shared objectives. Such organizations may consist of one or more organizations working to coordinate local and regional stakeholders from fragmented fields as part of developing and enacting a common agenda (Neeff, von Lüpke and Hovani, 2018). The organization's role is to enable a collective impact by, inter alia, facilitating the development of a common vision and strategy, establishing partnerships and fora, mobilizing resources, managing conflict and implementing monitoring (Neeff, von Lüpke and Hovani, 2018). Further, they may facilitate the development and implementation of specific activities or undertake other roles, depending on technical expertise and capacity.

Reinforcing horizontal dialogues across multistakeholder actors while enhancing cohesion across multiple levels of governance is both a key challenge and a requisite action for implementing integrated landscape approaches (Denier *et al.*, 2015; UNDP, 2020). Vertical supply chain initiatives can reinforce horizontal coordination, especially in landscapes where the dominant commodity production system is driving deforestation. For instance, the governments of Côte d'Ivoire and Ghana and 35 leading cocoa and chocolate companies formed the Cocoa & Forests Initiative (CFI) in 2017. This initiative fosters sustainable land use dialogues among stakeholders throughout cocoa value chains using commodity-centric landscape governance to drive systematic change in land use planning, while supporting private sector's sustainable business development (CFI, 2020).

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2.1.3 Strengthen decentralized authorities

National governments provide an overall framework within which subnational and local governments operate. Yet commitment of governments and other actors at the subnational and local level to address the root causes of deforestation and forest degradation, and their participation to partnerships and practices contributing to the achievement of this goal, are crucial to effecting change on the ground (Stickler *et al.*, 2018b).

Subnational governments are likely to be highly involved in enabling the implementation of integrated land use approaches, particularly when used at the level of subnational jurisdictions, and are critical to the success of public-private-producer partnerships. However, their authority to effectively do so is affected by the specific mandates and authority granted to them according to the national legal framework, the size and allocation of budget transfers from central government, varying levels of capacities to ensure the application of rules and regulations, and the provision of services to geographically dispersed populations. The transfer of responsibilities should, but often is not, be accompanied by the transfer of sufficient financial resources to fulfil the obligations.

Alternatively, regional and district level government actors may hold significant power to make decisions that impact land use, including approving land use permits (Juniyanti *et al.*, 2021), taxation, budgeting and roads (Busch & Amarjargal, 2020). They may be able to accomplish objectives that could be more challenging to effect at the national level, such as enacting provincial-level tax reforms or public procurement policies. In some countries, subnational governments may consolidate or co-house government ministries, facilitating more inter-agency collaboration at the local level. In certain contexts, subnational authorities are well-equipped to deliver or support the full suite of necessary components for integrated landscape governance approaches, however, for many, levels of authority and capacities vary (Busch & Amarjargal, 2020).

Sub-national level programmes and actions are integral to the delivery of national strategies and commitments. As such, investing in the capacities of subnational authorities and other local practitioners can support the effective implementation of national and international commitments on the ground (Box 12). For many private sector actors, particularly those seeking to pilot jurisdictional sourcing – in which all production in a certain area is considered "deforestation free" – it is important to have a direct link to the sourcing area, and to develop relationships with subnational governments, Indigenous Peoples, local civil society and communities. Indeed, many subnational-level targets for the achievement of commitments to reduce deforestation were developed under the framework of national legislation or programming, demonstrating the importance of national-level commitments for fostering subnational action, and the role of local government and other actors in achieving national objectives (Stickler *et al.*, 2018a).

Box 12
The Sustainable Districts Association (LTKL) in Indonesia

Lingkar Temu Kabupaten Lestari (LTKL), or the Sustainable Districts Association, is a membership-based association in Indonesia consisting of subnational district governments that works with more than 20 multistakeholder partnerships and civil society organizations (CSOs). A key organizational objective is to contribute to the national sustainable development agenda. LTKL was first established in 2017 by eight districts from six provinces in cooperation with the national association of district-level governments, Asosiasi Pemerintah Kabupaten Seluruh Indonesia (APKASI). LTKL provides technical, strategic and capacity development support to its member districts to transition to more sustainable development pathways, and helps connect district-level stakeholders to public, private and blended finance. Supported by a Secretariat based in Jakarta, it acts as a convener at the national level, and raises the profile of work across districts, including on sustainable land use, internationally. LTKL member districts have prioritized work in the areas of social forestry and agrarian reform, clean energy and electrification, control of forest and peatland fires, sustainable commodity production, conservation and restoration, waste management, and disaster prevention and response. They serve on the management board, pay a membership fee and agree to allocate a portion of their budgets to LTKL activities.

Source: Seymour, F.J., Aurora, L. & Arif, J. 2020. *The Jurisdictional Approach in Indonesia: Incentives, Actions and Facilitating Connections*. Frontiers in Forests and Global Change, 3.

2.1.4 Enforce the legal framework and promote legality

Illegal practices are an enduring driver of deforestation and forest degradation, and in particular, of commodity-driven deforestation. It has been estimated that almost half of tropical deforestation between 2000–2012 was driven by illegal conversion for commercial agriculture, with nearly half of the corresponding production destined for export (Forest Trends, 2021). Illegal deforestation can undermine both public and private sector commitments to sustainable agricultural and forest value chains as well as the achievement of emission reductions and REDD+ results. Encroachment onto forest land can result in land conflicts with with Indigenous Peoples and local communities and land disputes with land concession developers, among other consequences.

Significant advancements against deforestation and forest degradation can be accomplished through adherence to legal frameworks (Nolte *et al.*, 2017). Corruption and poor governance can impede the effective protection of forest reserves, or the enforcement of penalties for illegal activities. Emerging regulatory due diligence measures in "consumer countries", and the many private sector commitments mandating compliance with national laws, are sometimes weak or contradictory and inconsistently enforced. Governments are ultimately accountable for enforcing legal compliance and rule of law; voluntary corporate efforts on "zero deforestation" are no substitute for good governance, and the finance and private investment needed to transition to more sustainable practices will be restricted unless governments actively enforce legality and tackle corruption (Lambin *et al.*, 2018; UNDP, 2020).

Crucially, the design and implementation of a legal framework discouraging deforestation must not penalize the rural poor or MSMEs. Experience from the negotiation of FLEGT Voluntary Partnership Agreements (VPA) between the European Union and timber producing countries has demonstrated strong multistakeholder engagement in the development and piloting of laws and regulations can inform legislative reform; this can prevent the penalization of smallholders and MSMEs who may not have the resources or capacity to comply with legal requirements without external technical and financial support (Kwon and Ward, 2021; Pohnan *et al.,* 2022).

2.1.5 Enhance tenure security and protect the rights of Indigenous Peoples, local communities, women, youth and the rural poor

Strengthen tenure rights

Lack of clear tenure can be a barrier to sustainable use of land, forests and other resources. Some research has found that farmers with recognized land rights are more likely to invest in technology that intensifies and increases production than to expand into forests (Abman and Carney, 2020; Kubitza *et al.*, 2018; Salvini *et al.*, 2016). In Viet Nam, agricultural productivity and intensification increased when households had a greater share of land titled, but forestry activities decreased, suggesting there are many nuanced dynamics to the tenure, agriculture and deforestation debate (Abman and Carney, 2020). In Cameroon, land ownership has been a major factor to increase adoption of cocoa agroforestry systems, but tree tenure has affected outcomes in which most farmers prefer to plant fruit trees rather than timber species due to an increase in guaranteed rights (Alemagi *et al.*, 2015). In some countries, a lack of land tenure security was identified as a barrier to finance for producers seeking to adopt sustainable practices (Haupt *et al.*, 2018). The case of Niger's highly successful landscape restoration efforts demonstrates that tenure security to land and trees, and low cost technical support, can have a national impact on mitigating climate change and reducing pressures on existing forests (Stickler, 2019).

Enhanced security of tenure and resource rights, depending on the circumstances, and clarity on use rights, can encourage public and private investment; government and companies alike must understand who has the right to manage or use a certain unit of land to tailor appropriate incentives and interventions for fostering forest-agriculture synergies. This can include contractual agreements, conditional incentives, and payments for environmental services (PES) schemes, and shape appropriate and equitable benefit-sharing agreements, such as distributing monetary and non-monetary benefits of REDD+ (Wunder *et al.*, 2020). Together with the varied subsistence and commercial uses of forest products, this can contribute to making forest landscapes as economically profitable as agricultural landscapes.

It is advisable for governments to embed efforts to recognize and formalize tenure over agricultural and forest lands into a larger land use planning framework. The principles of the internationally agreed Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) can be used to inform and guide these processes. Significant investment – both technical and financial – is required to map and secure land rights, particularly where there may be conflicting claims or overlapping rights to the same parcel of land and its resources. Participatory spatial planning processes can help with the recognition, protection and support of legitimate tenure rights that may not already have recognition in statutory law (FAO, 2020b). Meanwhile, formalizing large areas under the "tenurial shell" approach, where customary rights are recognized by the state but not further formalized, can help speed up the process at a low cost (Fitzpatrick, 2005). Rights formalization can be prioritized where pressures on forests are high.

Clarify the rights of Indigenous Peoples, local communities, women, youth and the vulnerable

Indigenous Peoples are estimated to have rights to, or manage, approximately 28 percent of the world's land surface and 40 percent of global terrestrial protected areas (Garnett *et al.*, 2018). With appropriate support, securing Indigenous Peoples' and local communities' collective rights can reduce deforestation and degradation, mitigate climate change and protect biodiversity (Aggarwal *et al.*, 2021; Bradley and Fortuna, 2021; Arneth *et al.*, 2019; FAO and FILAC, 2021). In the Amazon region, formal demarcation of Indigenous Peoples' and tribal peoples' territories, when enforced by government, has proven to help impede encroachment of farmers and ranchers into forests in demarcated territories, increasing the legitimacy of Indigenous Peoples' claims and incentivizing agricultural intensification in already inhabited areas around the territories (FAO and FILAC, 2021). Granting and fully recognizing the land and resource rights of Indigenous Peoples and local communities in practice can allow for them to be recognized as actors with agency. This approach can empower their participation in and ability to benefit from monetary and non-monetary benefits of more sustainable agricultural production practices that protect forests and contribute to climate change mitigation and resilience (Buck *et al.*, 2019; Bradley and Fortuna, 2021; FAO and FILAC 2021).

Enhanced tenure security can facilitate stakeholder consultation and Free, Prior and Informed Consent (FPIC) processes, an international best practice enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and ILO 169, for any activity that affects the land, territories or livelihoods of Indigenous Peoples and local communities. The Cancun safeguards adopted by the UNFCCC require REDD+ processes and actions to "respect the knowledge and rights of Indigenous Peoples and members of local communities" and ensure "the full and effective participation of all relevant stakeholders; in particular, Indigenous Peoples and local communities".

A transition to agricultural pathways with positive effects on forests must not place disproportionate burdens on rural livelihoods or those living in extreme poverty; more than 80 percent of the extreme poor live in rural areas, and 65 percent work in the agriculture sector (Castañeda *et al.*, 2018). To avoid exacerbating rural income inequalities, actions should ensure noncompliant small farmers are not excluded from market-based mechanisms aiming to promote more sustainable agriculture (Garrett *et al.*, 2021), but rather included in processes to encourage progressive improvement. Initiatives to formalize and strengthen rights of the nearly one billion people with perceived tenure insecurity should be extended to the large numbers of farmers under sharecropping and lease-holding arrangements to incentivize longer-term investments (Prindex, 2020). In addition, governments can promote restoration and agroforestry through the implementation of conditional leases or tenure agreements, where landless farmers and others can be offered long-term, secure rights to trees and tree products in exchange for adopting "forest positive"/ climate-smart agricultural practices (FAO and ICRAF, 2019). Temporary use rights may be replaced by more secure rights (such as ownership) upon successful adoption of these practices. Strengthening women's rights to land and trees in statutory law as well as customary practices will help further the reach towards critical stakeholders; in many countries, women have limited access to, and control over, productive resources, including land, impeding their access to credit and investments in improving agricultural productivity, as land is commonly used as collateral for agricultural lending (Mesfin, 2021; Ignaciuk *et al.*, 2021).

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2.2 Design and support forest, land use and agricultural monitoring systems that enable better policymaking

2.2.1 Develop forestry, land use and agricultural monitoring systems that generate data and are suitable to inform policymaking

Data can serve to inform agenda setting and policy design, implementation and evaluation. Collecting the same sets of data over time can serve to identify trends in a positive or negative direction, such as the achievement of agricultural production or reforestation targets, and correlations between different variables. They can help assess indicators developed in the context of broader monitoring frameworks.

National monitoring systems are essential for enabling public entities, as well the private sector and civil society, to take better decisions (FAO, 2020a). Governments have a key role and responsibility in ensuring monitoring systems and their results are purposefully designed, consistent, transparent, reliable, accessible and fully functional to serve both domestic functions as well as international reporting requirements, such as REDD+ baselines and results reporting (FAO, 2020a). Public bodies in charge of monitoring systems should guarantee information is accessible to its users, both physically and conceptually, with data communicated in an understandable way, and analysis tailored to different audiences (FAO, 2020a; Gardner *et al.*, 2018). Transparency at sufficient scale and depth is critical for ensuring the accountability of both public and private commitments to eliminating deforestation in agricultural value chains (zu Ermgassen *et al.*, 2020). It is a key prerequisite for accessing results-based finance, including for REDD+ results, and is enshrined in the Enhanced Transparency Framework (ETF) of the Paris Agreement. In the framework of the UNFCCC, governments therefore commit to ensuring transparency in the design of forest and land monitoring systems. Adherence to open data principles can enable the production and sharing of open, transparent and reliable forest and land data, which can increase public trust, as well as opportunities for private investment (Ramírez *et al.*, 2022). Access across ministries, but also other stakeholder groups, to these data can enhance the credibility of such systems, thus promoting confidence.

Governments can promote and take advantage of advances and innovation in remote sensing, cloud infrastructure and machine learning and commit to making open geospatial data increasingly accessible for the public. The scope of tools that could be used to monitor agriculture and forest and land use change is dependent on the commitment(s) or risks monitored and their associated components. Relevant remote sensing tools may include SEPAL, used by forest countries to monitor forests and land use change. SEPAL, among other tools, has enabled FAO to develop a range of methodologies to map and monitor forest disturbances and assess associated proximate drivers based on free and open- source remote sensing solutions. One sample-based methodology is currently being applied at a regional scale in both Central and West Africa to provide updated statistics on deforestation and degradation for the period 2015–2020, and is being used by three countries in the Congo Basin (the Republic of Congo, the Democratic Republic of the Congo, and Equatorial Guinea) as the central part of their NFMS, regularly updating statistics for REDD+ reporting to the UNFCCC. An online platform and registry for the Framework for Ecosystem Restoration Monitoring were developed in the framework of the UN Decade for Ecosystem Restoration (2021–2030).

External monitoring using geospatial data alone, however, may not provide the full picture of information required, such as biodiversity and social impact (Jopke and Schoneveld, 2018; Lambin *et al.*, 2018). Collaboration with partners, such as Indigenous Peoples, local communities and private actors, can be important to crafting a fuller picture of what is happening on the ground; NFMS and near-real time monitoring can be used by local stakeholders to monitor and flag forest conversion, and in some cases, help determine causes of illegal activities (FAO, 2022c). Near-real time monitoring data can be shared across government ministries and with locally based government officials, as well as local communities, to monitor and ground-truth reports of deforestation and encroachment, enhancing enforcement efforts (Box 13).

Box 13

Complementing geospatial data with local government and community action to identify and address encroachment into forest areas

In the Democratic Republic of the Congo, the NFMS developed and maintained by the Ministry of Environment is providing regular data updates to the Ministry of Agriculture on deforestation alerts. These alerts are dispatched on a monthly basis to the Provincial Inspectorate of Agriculture, Fishery and Livestock (IPAPEL) to help provincial and local officers control and monitor agricultural expansion in the field. Information verified by IPAPEL officers is shared at the central level between the Ministries of Agriculture and Environment to better inform land use planning and adapt REDD+ policies and measures for halting deforestation.

In other places, information about deforestation or encroachment is communicated to, or can be signalled by, local communities. In Thailand, remote sensing time series data is being analysed to determine patterns of agricultural encroachment on forest management boundaries. Community forest leaders, together with local forestry officials, are able to ground-truth remote sensing data, identifying areas of illegal deforestation. In four of the twenty sites checked to date, discussions have been held with landowners, and there are plans to conduct long-term land use planning, as well as continue with the monitoring of high-risk areas.

Source: Authors' own elaboration.

When considering what kind of information is needed to monitor deforestation and forest degradation and the possible linkages with agriculture, governments could consider what type of data they are already collecting; countries with NFMS in place may already track forest area, forest quality and land use change. In many cases, countries with REDD+ Safeguards Information Systems (SIS), another REDD+ Warsaw framework requirement, may have mapped the major information systems for both socio-economic and environmental monitoring, as they relate to deforestation and forest degradation in order to consolidate information reported to the UNFCCC through safeguards summaries of information (UN-REDD, 2020). In addition to countries' NFMS and SIS, other critical information sources may contain production data, export/import data and land tenure data, among others. In some cases, bespoke datasets are required; the NFMS many countries are developing in a REDD+ context are not always built to be relevant to activities on the ground (Neeff, von Lüpke and Hovani, 2018). Often, systems are needed that collect location- or commodity-specific data – for instance, producer association-developed due diligence systems for timber, in the case of Viet Nam.

Governments in many countries producing internationally traded commodities have displayed increased interest in developing Information Technology (IT)-based traceability systems for certain commodities with high international demand for proof-of-origin, such as timber (FAO, 2016b; FAO and WRI, 2022). As experience with these systems compounds, they realized the potential for these systems to improve existing data collection and reporting systems and to improve revenue capture from royalties and fees paid from timber production. It may be advisable for governments to facilitate the interoperability of traceability systems, where feasible, to avoid the need for producers or MSMEs to submit or validate data in multiple systems; smaller producers may struggle to meet the demands of traceability requirements (Gardner *et al.*, 2018). However, this may be challenging to implement due to operational barriers and confidentiality concerns. Private sector actors may resist funding robust traceability systems for individual commodities, which can be costly, or limit the number of farmers they source from to reduce costs of verifying compliance (Jopke and Schoneveld, 2018). Governments may thus need to undertake complementary actions to encourage private sector action, such as legislation mandating due diligence for deforestation in agricultural commodity supply chains and its enforcement.

2.2.2 Institutionalize monitoring systems and cross-sectoral collaboration

The institutionalization of forest and land use monitoring frameworks and allocation of budgeting for continuation is critical to their credibility and continuity. To move towards a more solid institutional setting that provides transparent and accessible forest and agriculture data, governments could adopt legal frameworks clearly establishing the roles and mandates of the different entities involved in forest and land monitoring systems (FAO, 2021b). Legal texts or other forms of inter-ministerial agreements outlining roles and responsibilities, such as political and technical leadership, collaboration across departments and ministries to collate, manage, analyse and disseminate data, as well as data sharing policies and considerations for confidentiality concerns, can contribute to information systems' long-term sustainability (FAO, 2021b; Ramírez *et al.*, 2022). The development of legal and institutional arrangements can accompany and encourage progress with regards to setting up the governance structure for an integrated monitoring system, while ensuring the appropriate institutions are involved from the beginning of the process and financial resources to sustain the system are identified (FAO, 2021b).

While NFMS are often hosted by ministries of forestry or environment, they must entail engagement with other ministries, such as agriculture and planning. Comparing NFMS data to other sources of information, including those related to agricultural production or traceability, could significantly increase the potential of NFMS and other systems to inform decision-making that reduces deforestation, as could developing or expanding multipurpose systems for land cover and land use more generally (Box 14). In some countries, steps are first needed to ensure a consistent definition of forest and agricultural land across information systems and ministries, which may require significant investment and technical support. Governments are encouraged to foster articulation between NFMS and other information systems that may host complementary information key to monitoring, inter alia, land use, agricultural production, biodiversity, and poverty.

Existing monitoring systems developed by government and other stakeholders can inform the design and development of shared monitoring systems that include a broader range of stakeholders and context-relevant metrics. Collaborative efforts to address deforestation will require support to agree on, set up, and use a shared monitoring and evaluation system (Neeff, von Lüpke and Hovani, 2018). Depending on the dynamics between actors, subnational governments have an important role to play in collecting, analysing, and interpreting data, as well as in arranging for technical assistance and capacity building with actors to handle data. Development of a monitoring framework for integrated landscape approaches can help stakeholders keep track of and reassess objectives and progress (Reed *et al.*, 2020; Ros-Tonen, Reed and Sunderland, 2018). The LandScale assessment framework is one example of a tool that helps measure different elements of sustainability in a landscape; it has four pillars to assess ecosystems, governance, human well-being and production.

Box 14
Cross-sectoral coordination for monitoring land and forest cover in Costa Rica

Costa Rica's Ministry of Environment and Energy (MINAE) and the Ministry of Agriculture and Livestock have collaborated, together with the Ministry of Justice and Peace, to develop SIMOCUTE, a multipurpose national system to monitor land cover, land use and ecosystems, as well as agricultural and biodiversity resources, which has been institutionalized via a presidential decree. MINAE's National Center for Geoenvironmental Information (CENIGA) hosts SIMOCUTE and a related platform, and led its development through a participatory and inter-institutional process, engaging more than 40 government, academic and private sector institutions providing information to the system (FAO, 2021c).

Costa Rica has also developed a Land Use Change Monitoring Tool for Production Landscapes Tied to Tenancy (MOCCUP), which uses remote sensing to map year-to-year changes of agricultural commodity and forest cover areas; these are compared with records from the Costa Rican Property Registration Directorate to identify the legality of land use change. It covers data related to pineapple, sugar cane and palm oil production as well as pastureland. The data produced via this tool is published through the National Land Information System and used by the public sector to enhance enforcement of Forestry Law and the Protected Area system. They can be used by the private sector to identify products that are linked to illegal deforestation (UNDP, 2021).

Source: FAO. 2021c. *Costa Rica's progress in developing a national land use, land cover and ecosystems monitoring system*. FAO.; **UNDP.** 2021. *Palm oil, Pineapples and Partnerships: Impact and Lessons from a Decade of Transforming Agricultural Commodities*. Report.

2.3 Invest in capacity development and knowledge generation for producers

2.3.1 Provide technical assistance and extension services

Technical assistance and the delivery of extension services to farmers are vital to support the adoption of more sustainable production models. In Ghana, for example, smallholder cocoa farmers receiving extension support have yields three times as high as those that do not, increasing their incomes (Fishman *et al.*, 2017; Deans *et al.*, 2018). Yet some companies committed to removing deforestation from their supply chains may lack the direct connection, incentives and means to provide technical assistance to producers. Outside of limited pilots, compliance-focused companies have yet to provide adequate technical assistance to producers to adopt good practices at scale, and others look to public sector capacity building programmes to fill the capacity gap (Jopke and Schoneveld, 2018; Taylor and Streck, 2018). Moreover, corporate commitments are often limited to agricultural commodities placed on international markets, and as such, companies are unlikely to assume technical assistance needed to make the production of food for domestic markets more sustainable. Therefore, farmers have little opportunity to adopt effective practices without an increase of technical assistance from the public sector and other partners, such as producer and community associations or NGOs (Taylor and Streck, 2018).

National extension services and programmes aligned to international sectoral standards for responsible production of agricultural and forestry products and processing/chain of custody practices, and those coordinating private and public initiatives, are well positioned to promote the adoption of improved agricultural practices. In some cases, a multistakeholder platform well embedded with the relevant partners may be best suited to fill this role, while in others, a producer organization could be logical, or a new organization may need to be set up. Providing capacity building and technical support to a diverse range of stakeholders and organizations can lessen the loss of institutional knowledge associated with political turnover (Fishbein and Lee, 2015). While technical assistance and extension activities that improve production efficiency and lead to higher yields can result in higher monetary benefits for producers, this requires adequate investment through support to sustainable business models and subsidies for agricultural commodity production decoupled from deforestation (Lambin *et al.*, 2018; Taylor and Streck, 2018). Public action should be focused on reaching and supporting women, who are less likely than men to benefit from extension systems and subsidy programs (Ignaciuk *et al.*, 2021).

2.3.2 Invest in research, development and knowledge exchange for agricultural technologies and innovation

Approximately USD 56 billion is spent annually on agricultural research and development (R&D); however, the vast majority of this research focuses on improving yields for food security, and is not sufficiently focused on innovative agricultural practices that contribute to forest and biodiversity conservation and achieving climate objectives (Fuglie *et al.*, 2020). Better farming practices can increase farmer incomes and improve sustainability along the value chain. To address this gap, governments are encouraged to frame and support R&D to reinforce the pathway to more sustainable production models, including through improving agroforestry technologies developed by small-scale farmers and providing innovative technologies along the value chain, from production, processing and packaging to distribution (FOLU, 2019).

Such innovations can increase the added value of the product, enhancing efficiency, fair distribution of benefits, and improving farmer's livelihoods; this can be done collaboratively with "consumer countries" and corporate actors.

Governments can encourage knowledge exchanges and technological transfer among their own entities, farmers, academia and research institutions. They can promote collective thinking across "consumer" and "producer" countries, or between stakeholders linked to similar production landscapes (Box 15). Corporate retailers' R&D departments can play an important role in working with different actors and across landscapes they source from, strengthening the viability of the sustainable supply chains and farmers' resilience, and in particular, accompanying technological exchange with sufficient financial and technical support. In Brazil, global agricultural corporations collaborated with farmer groups and governments to introduce innovative solutions to halt deforestation through R&D, resulting in increased soybean production (Hull *et al.*, 2016). In addition to technological development, well-developed extension services and dissemination of information related to technology are essential to the promotion and adoption of innovative technologies for sustainable production systems (Fuglie *et al.*, 2020).

Box 15

International cooperation enables technology transfer for increased productivity and sustainability of cocoa production in West Africa

The West African countries produce over 75 percent of the world's cocoa beans. According to the International Cocoa Organization (ICCO), Côte d'Ivoire was the largest producer in the 2018/19 Agricultural Year at 2.15 million tonnes, followed by Ghana at 0.8 million tonnes. The majority (ca. 90 percent or 2 million in number) of cocoa farms in West Africa are family farms holding less than 2 ha of cocoa plantation on average. Cocoa beans contribute to more than half of cash income, in turn contributing to food security. Moreover, cocoa export plays an essential role in sustaining growth of the regional economy. However, cocoa productivity has been decreasing due to ineffective farming practices, aging cocoa trees and low soil fertility. It is predicted the average annual temperature in Côte d'Ivoire and Ghana could rise by 2°C by 2050, increasing evapotranspiration and drought stress on cocoa farms, thereby potentially reducing areas suitable for cocoa cultivation drastically in both countries.

The Tomé-Açu Agroforestry System (SAFTA), initiated by the Japanese-Brazilians farming in the Amazon for almost a century, has proven its productivity performance and sustainability (Futemma *et al.*, 2020; Subler and Uhl, 1990). This successional system begins with annual species intercropped with perennial and arboreal ones and develops over decades into a plantation growing under multi-purpose trees. It involves practices such as proper spacing and pruning, enabling an increase in cocoa productivity as well as farm income diversification. In 2016, this technology was piloted in Ghana to mitigate the negative impact of rising temperatures, while generating ideal bioclimatic conditions for cocoa production. It is a viable alternative to full-sun cocoa monoculture challenging the sustainability of ecosystems and food systems in the region. The SAFTA has been disseminated to different parts of the Amazon and acknowledged as a sustainable social technology by the Brazilian government.

Source: Futemma, C., Castro, F.D. & Brondizio, E.S. 2020. *Farmers and Social Innovations in Rural Development: Collaborative Arrangements in Eastern Brazilian Amazon*. Land Use Policy, 99.; **Subler, S. & Uhl, C.** 1990. *Japanese agroforestry in Amazonia: a case study in Tomé-Açu, Brazil*. In: Alternatives to deforestation: steps towards sustainable use of the Amazon rain forest. Anderson, A.B. eds. pp.152–166. Columbia University Press: New York.

2.4 Establish measures and incentives to develop and strengthen legal and sustainable agricultural value chains

2.4.1 Repurpose agricultural subsidies and financial incentives to consider the value of natural capital and ecosystem services

The reform of agricultural subsidies and financial incentives is vital to protect forests and scale up sustainable agriculture practices. No single financial incentive can dissuade forest conversion and encourage sustainable agriculture; governments can assess and realign the numerous financial and policy influences on farmers to create a holistic package, accounting for different interests of stakeholders, including their own, and the impact of any transition on small-scale farmers, women and youth (FOLU, 2019). Different measures are required according to local circumstances, as similar measures can have very different impacts under differing conditions; a reduction of credit or an increase in input costs for commercial agriculture may reduce deforestation, whereas the same policy would increase deforestation if directed to subsistence farmers (Ngoma *et al.*, 2018; World Bank, 2021).

Globally, nearly USD 540 billion annually is allocated to support farmers directly through price incentives, fiscal subsidies and public sector services; over 85 percent of this support is distributed through price incentives, such as border measures affecting trade and domestic market prices and fiscal subsidies tied to the production of specific commodities (FAO, UNDP and UNEP, 2021). This can promote the overuse of inputs and overproduction, which are price-distorting and have been linked to harmful environmental and social impacts (FAO, UNDP and UNEP, 2021).

Governments can undertake reforms to agricultural support measures, aiming to limit agricultural expansion leading to forest conversion. These should be tailored according to local contexts and support inclusion. Socially and environmentally inefficient agricultural support funds could be usefully redirected to invest in public goods and services for the agriculture sector and fiscal subsidies decoupled from production of particular commodities (FAO, UNDP and UNEP, 2021).

When formulating agricultural support measures, governments should consider the potential impact of the measures, not only on food security, food prices, agricultural production and export revenues, but on forests, accounting for the value of natural capital and ecosystems services. However, the value of natural resources and forests are often overlooked or underestimated due to mismeasurement, mispricing, illegal logging, and other factors (IBRD/The World Bank, 2021). Forest ecosystem services, excluding timber and carbon, were estimated to be valued at USD 7.5 trillion globally in 2018, with timber worth an additional USD 2.7 billion (World Bank, 2021). Natural capital, including forests and protected areas, made up 47 percent of low-income countries' wealth in 2014, whereas it accounted for only 3 percent of national wealth in high-income countries (Lange, Wodon and Carey, 2018).

Key examples of government actions to facilitate more sustainable production practices include providing price premiums, credit guarantees, subsidies or financing terms to support small-scale farmers to cover compliance costs, and disincentives for deforestation through financial penalties or credit restrictions for entities found not to be in compliance (Bakhtary *et al.*, 2020). Financial incentive packages should include and encourage the adoption and continued implementation of sustainable production practices tied to preserving forest cover, such as implementing PES and the use of conditional loans, and avoid perverse incentives (FOLU, 2019). Support conditional on set sustainability practices, or on other conditions, may enhance reductions of environmental impacts such as deforestation (Box 16) (Alemagi *et al.*, 2015; FAO, UNDP and UNEP, 2021). It is important governments design and implement such schemes with consideration for social inclusion to address existing biases or gaps in access to finance and extension services, such as gender and age.

Box 16

Using data to inform conditional finance for climate smart agriculture and reduce deforestation in Brazil

At the national and subnational level, Brazil has used innovative technological and financing approaches to monitor deforestation and link application of its REDD+ strategy and Low-Carbon Agriculture programme (ABC Plan) (Ngoma *et al.*, 2018). The government linked remote sensing with land ownership records to track deforestation. It used annual deforestation maps and statistics available through a geoportal of the National Institute for Space Research (INPE)'s Programme for the Calculation of Deforestation in the Amazon (PRODES), together with an assessment of minimum forest cover (legal reserve) requirements, for individual properties using digitalized, self-declarations of land registration through the CAR – rural environmental registry, made mandatory by the 2012 Forest Code. This information helped inform the implementation and monitoring of conditional access to agricultural loans for landowners registered with the CAR who complied with the forest cover requirements for their properties. Through its ABC plan, Brazil provided low-interest loans to farmers who sought to implement sustainable agriculture practices, including no-till agriculture, restoration of degraded pasture, planting of commercial forests, biological nitrogen fixation, treatment of animal wastes and integration of crops, livestock and forest systems (Ngoma *et al.*, 2018). PRODES helped identify municipalities with the highest levels of deforestation, which were signalled as priority areas for enforcement and had access to public funding limited (FAO, 2020a).

Source: FAO. 2020a. *Better data, better decisions – Towards impactful forest monitoring*. Forestry Working Paper Rome FAO.; **Ngoma, H., Angelsen, A., Carter, S. & Roman-Cuesta, R.M.** 2018. *Climate-smart agriculture: Will higher yields lead to lower deforestation?* Bogor, Indonesia.

2.4.2 Adopt measures to support markets for legal and sustainable agricultural products

Fostering market-based measures for the private sector and international partners provides "producer countries" with opportunities to demonstrate a strong commitment to the facilitation and promotion of agriculture approaches and practices that are not associated with the detriment of forests.

"Producer country" governments can build on civil society and private sector approaches to establish an enabling environment for producers committed to forest protection and for domestic and international investment supporting responsible agricultural business conduct. One approach is defining "forest positive" or "deforestation-free" agriculture - or other nationally agreed language reflecting enhanced synergies between agriculture and forestry - in a national context, as a basis for integrating considerations guarding against forest conversion and fragmentation into definitions of "sustainable agriculture" and related policies (Box 17). This would further embed forest protection and promotion of integrated approaches of land planning into national development objectives and into public action.

Box 17
Deforestation-free certification for agricultural and livestock production in Ecuador

In January 2021, Ecuador's Ministry of Environment and Water, Ministry of Agriculture and Livestock and Agency for the Regulation and Control of Phytosanitary and Animal Health (Agrocalidad) signed an inter-ministerial agreement establishing a national definition of deforestation-free production and mandating the development of technical regulations for certification and the incorporation of the model into the agricultural and livestock sector. The certification focuses on four key commodities in the Amazonia region and will be part of the "Premium & Sustainable" brand developed by Ecuador in 2019, to market sustainably produced goods to domestic and international markets; this contributes to the implementation of Ecuador's National REDD+ Strategy. The Government of Ecuador is coordinating with local producer groups, including the Federation of Small Organic Agricultural Exporters of the Southern Ecuadorian Amazon (APEOSAE), Association of Coffee Growers of the Mayo River Basin (ACRIM), Aromas del Sur Cocoa and Derivatives Production Association (ASOPROMAS) and the Agro-Artisan Association of Ecological Producers (APECAP), as well as companies such as Lavazza and Olam.

Source: Authors' own elaboration.

Lessons can be drawn from implementation of the European Union's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, through which national governments in 15 countries have led multistakeholder processes together with private sector and civil society to determine national definitions of "timber legality" and design systems that assure the legality of timber and enable timber exports to the European Union (FAO, 2022a). These systems are aligned with national development objectives, as "producer countries" choose to develop them, and as they contribute to multiple government priorities such as improving governance, promoting trade and increasing contribution of forest production to the national gross domestic product (GDP). These legality assurance systems can be used as a blueprint for developing similar systems for agricultural commodities.

In addition to developing national definitions, such as "deforestation-free" or "forest positive production", countries can develop branding strategies to appeal to international markets, as in Ecuador and in Acre, Brazil, the latter of which has developed markets for high-value products such as Brazil nuts (Fishman *et al.*, 2017). Countries can develop compulsory national or commodity-specific social and environmental standards adapted to national conditions and expectations, like the African Regional Standard on Sustainable Cocoa - ARS 1000, defined by the Conseil Café Cacao of Côte d'Ivoire and the Ghana Cocoa Board of Ghana, or the MSPO national standards for palm oil in Malaysia. Governments and national parliaments can adopt legislative frameworks laying out mandatory minimum standards for production (Lambin and Thorlakson, 2018). While a major aim of improving production is to unlock price premiums, where these are not achievable, positive environmental outcomes can still be achieved through mandatory standards, though, compliance may require public support to small-scale producers. Standards could foster more sustainable production, ensuring deforestation features alongside other risk areas such as child labour, human rights, and food security. Moreover, they could help ensure access of national commodity products to international markets with increasingly demanding due diligence and other requirements (Box 18).

In developing relevant definitions or national standards, governments can provide a tangible vision for the public and private sectors to rally for, and encourage, confidence in the diverse initiatives effectively contributing to a common agenda (UNDP, 2020; Lambin and Thorlakson, 2018). Processes to reach a common definition may be widely accepted when conducted in a participatory multistakeholder manner, recognizing the insights of groups such as women, youth, Indigenous Peoples and local communities. Yet stringent international standards are unlikely to be effective if trade in certain commodities can easily be diverted to less discerning international or domestic markets (Seymour and Harris, 2019). By enforcing national or commodity-specific standards, countries can reduce the emergence of parallel value chains with less stringent sustainability or legality requirements, allowing for private sector growth and achievement of economic objectives; this promotes a stable regulatory environment in which to operate and encourages responsible business conduct in line with internationally recognized good practice. Notably, this should be paired with sufficient technical and financial support to producers, particularly small-scale farmers and MSMEs, and other supply chain actors, to meet the standards and bear the costs. In Lao People's Democratic Republic, the government is working with partners to ensure the promotion of cash crop production under contract farming arrangements is aligned with the Principles for Responsible investment in agriculture and food systems (CFS-RAI Principles) and the ASEAN Guidelines on Promoting Responsible Investment in Food, Agriculture and Forestry (ASEAN RAI), adopted by Ministers on Agriculture and Forestry of the Association of Southeast Asian Nations (ASEAN) in 2018. Governments can also adopt national responsible public purchasing policies, such as in Cameroon where the government has adopted a public procurement policy making purchasing verified legal timber compulsory for all public tenders (FAO, 2021d). A brief overview of actions that can be taken by governments, businesses and financial institutions to enact systematic market changes can be found in Table 2.

Box 18

Application of standards for palm oil through trade agreements between Indonesia and Switzerland

Support to improve the sustainability and legality of production practices in specific value chains can be key in facilitating producers' access to international markets. For instance, the Comprehensive Economic Agreement (CEPA), a free trade agreement between the Government of Indonesia and Member States of the European Free Trade Association (Norway, Switzerland, Iceland and Liechtenstein) signed in 2018 and which came into force in November 2021, introduces a preferential tariff rate for palm oil imported into Switzerland up to a certain volume. Tariffs are reduced by around 20 to 40 percent, if the palm oil complies with the sustainability goals set out in Article 8.10 of the CEPA on "Sustainable Management of the Vegetable Oils Sector and Associated Trade", covering law enforcement to protect forests and peatlands, halting deforestation and peatland drainage and protection of the rights of Indigenous Peoples and workers. Any of the four existing certification systems can be used to demonstrate compliance:

- RSPO with identity-preserved supply chains,
- RSPO with segregated supply chains,
- the International Sustainability and Carbon Certification (ISCC), in its PLUS Segregated version,
- the Palm Oil Innovation Group (POIG), in combination with RSPO segregated or identity-preserved channels.

Proof of sustainability must be approved by Switzerland's State Secretariat for Economic Affairs, and the conditions of transport are regulated to ensure sufficient traceability of the imported palm oil.

Source: Authors' own elaboration.

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Table 2

Actions to systematically change the market by integrating landscape strategies with business

	Business leaders	Financial institutions	"Producer country" governments
Strategy/ Plan	• Integrate due diligence into business activities.	• Embed due diligence for deforestation and forest degradation risks in financing strategy.	• Enforce legality; • Provide technical and financial support to small-scale farmers.
Innovation/ Prioritization	• Consider blended finance, including climate finance opportunities; • Support more sustainable production systems; • Ensure traceability along value chains.	• Leverage grant funds to support market development, including blended finance options;	• Create mandatory financial disclosure requirements; • Provide supporting regulations for transparency and innovation.
Business development	• Business model and technology innovation; • Develop/apply supply chain wide traceability; • Disclose results to shareholders and consumers.	• Create innovative financial mechanisms to offset risk and return trade-offs for private investment.	• Provide incentives to environmentally- and forest-friendly investments; • Use public procurement as a tool to drive sustainable production.
Partnerships	• Partner with local communities/ producer organizations/MSMEs in the supply chain; • Engage in multistakeholder/ landscape processes.	• Ensure finance is aligned with emerging international initiatives and reaches small scale farmers and MSMEs.	• Convene multistakeholder partnerships and dialogues and seek shared vision and solutions.
	Drivers of actions to improve synergies between agriculture and forests		
	• Reduced reputational risks; • reduced supply • buyer requirements; • licence to operate; • legal compliance;	• long-term productivity; • cost savings; • mobilization of finance; • concerns for global crisis and international commitments; • long term development; and • ecosystem services and climate resilience.	

Source: Authors' own elaboration. Informed by **CDP**. 2021. The collective effort to end deforestation: a pathway for governments to raise their ambition. In: *CDP*. London, U.K. Cited 8 August 2022.; **Heiner, K., Buck, L., Gross, L., Hart, A. & Stam, N.** 2017. *Public-private-civic partnerships for sustainable landscapes: A Practical Guide for Conveners.* Utrecht. The Sustainable Trade Initiative (IDH).; **Scherr, S.J., Shames, S., Gross, L., Borges, M.A., Bos, G. & Brasser, A.** 2017. *Business for Sustainable Landscapes: An Action Agenda to Advance Landscape Partnerships for Sustainable Development*. Washington, DC, 16 May 2017.; **World Economic Forum**. 2020. *Incentivizing Food Systems Transformation.* Davos, World Economic Forum.

2.4.3 Engage with international regulatory developments

Influence international policy and programme formulation and public investment

National governments are responsible for setting and implementing national policy and legislation to meet the needs of their citizens. Internationally negotiated policy and trade agreements can impact government mandates to act on certain issues, as well as their abilities to access financial resources and technical support from international assistance and multilateral development banks. As such, "producer country" governments should develop a consistent national position to be advocated for by representatives in multilateral negotiations in all areas related to agricultural and forest commodity production and trade, including economic development, food security, biodiversity, forestry and climate change.

In general, "producer country" governments may be able to achieve greater impact by taking a multipronged approach to international engagement and cooperation, fostering partnerships with "consumer countries" and the private sector, and access to finance, by engaging not only in multilateral negotiation processes but also in multistakeholder international and regional platforms, such as the NYDF, TFA, the FACT Dialogue, Food Systems Summit coalitions, the EU Multi-Stakeholder Platform on Protecting and Restoring the World's Forests and the EU Multistakeholder Dialogue on Sustainable Cocoa. These fora provide opportunities to ensure resource partners understand the specific national contexts and needs of forest countries, and how international cooperation programmes and investment priorities can be aligned to these needs. Bilateral or multilateral "producer country" dialogue with "consumer countries" can inform the design of forthcoming regulatory initiatives, such as those by the United Kingdom of Great Britain and Northern Ireland, the European Union and the United States of America, to advocate for alignment across such initiatives and their feasibility for producers. These dialogues and ensuing collaboration can create essential links and foster coherence and complementarity between vertical sustainability initiatives along supply chains and horizontal landscape approaches on the ground.

Facilitate producers' representation in international processes

In the case of agricultural commodities associated with deforestation, a small number of "consumer countries" hold considerable market and regulatory power to shape discourse and practices of retailers, traders and producers, with significant implications for actors in "producer countries". To counteract this imbalance, "producer country" governments can take proactive steps to track trends in consumer preferences that could have an impact on export revenue and trade in agricultural commodities. They can facilitate dialogue with national private sector actors and pursue cooperation with other "producer countries" on a common agenda. Governments can facilitate the representation of national private sector stakeholders – including farmers and MSMEs – in international discourse and negotiations. These actors can provide practical on-the-ground insights depending on the sector-specific business situation, informing future trade policies. Representation of the private sector can be made collective through apex bodies or by sectoral associations. By creating opportunities for representation, governments can empower private sector associations and federations by demonstrating value to their members, creating an incentive for informal actors to formalize, to strengthen their voice in representation.

2.4.4 Promote innovative public finance to support sustainable production systems and foster responsible private investment

To meet global climate, biodiversity, and land degradation targets, global investments into nature-based solutions must scale up by four-fold by 2050 (UNEP, 2021). Conflicting and non-aligned financial incentives are underlying drivers of deforestation in many countries and undermine efforts to reduce forest loss (Bastos Lima *et al.*, 2017). There is an urgent need to both increase the scale of finance for efforts to reduce agriculture-related deforestation and to align multiple financial flows with competing and overlapping objectives within the same landscape.

In addition to aligning existing financial flows, adoption of innovative financing strategies can help close the financing gap. Sources of finance are diverse, ranging from international and domestic sources and results-based programmes to private sector investments (Fishman *et al.*, 2017). Key government actions may include policy coherence, pursuit of new investment mechanisms, strategic use of public investments to strengthen enabling conditions, de-risking of private investment and mobilization of additional finance, carbon markets/REDD+ results-based finance and redirecting private sector investments to more sustainable agricultural practices. Sources of finance can be diverse, ranging from international and domestic sources and results-based programmes to private sector investments (Fishman *et al.*, 2017).

By leveraging climate finance for REDD+ RBPs, along with emerging market opportunities towards achievement of NDCs or for other international mitigation purposes, governments can help fund actions needed for halting deforestation, enhancing restoration and increasing sustainable use of forests. Targeted public funds can mobilize greater flows of private finance by de-risking agricultural and forestry investments that contribute to agrifood systems transformation, using tools such as guarantees, agri-insurance for small-scale farmers, blended finance and support for innovative microfinance initiatives (UNEP, 2021). Governments could consider providing price premiums, insurance, subsidies, or financing terms to support small-scale farmers to cover the costs of compliance with new standards. They could also disincentivize deforestation through financial penalties or credit restrictions for non-compliance entities.

Blended finance, a model that strategically directs public finance to de-risk and mobilize private or other sources of finance for sustainable development, concessional finance, and green bonds, are tools that can be used to access the private capital needed to fund more sustainable agricultural practices. De-risking institutional investment instruments and innovating business models that would redirect corporate profit to encourage transformation can present key pathways to incentivizing a transition to more sustainable agriculture (WEF, 2020). Supporting innovation in finance and technology can contribute not only to new business models for companies to meet commitments and seize new opportunities, but also help link such corporate efforts to local farmers. Examples of business innovation include digital platforms for investment matchmaking that allow international investors and local financial institutions to pursue various co-investment planning (WEF, 2021a). Further, national financial regulators can act to encourage

domestic and regional financial institutions to integrate ESG criteria into their lending criteria, as some emerging economies in the Sustainable Banking and Finance Network have moved to do (Pacheco *et al.*, 2021).

Practically, both national and subnational level governments are involved in multilevel governance, de-risking investment with producers at the subnational level, reforming fiscal measures, or institutionalizing benefit sharing mechanisms at the national level. Coherence in reforms between subnational and national governments across multiple sectors is required to ensure the financial infrastructure supports the intervention goals of and safeguards local stakeholders and beneficiaries. This coordination is essential for integrated landscape approaches, as the ability of subnational administrations to influence fiscal policy and incentives varies by country and subnational authorities (Busch and Amarjargal, 2020). Ecological fiscal transfers are one means to transfer funds from central governments to subnational governments based on performance according to one or more indicators, such as reduced deforestation, ecosystem services provided and area certified (IBRD/The World Bank, 2021). In addition, both national and subnational governments can access new funds that finance actions to remove conversion from commodity production, such as the Agri3Fund, contributing to better enabling conditions for commercial lenders to help develop sustainable finance roadmaps (Box 19) (Tobin-de la Puente and Mitchell, 2021).

Box 19
Green finance with a subnational approach

Subnational governments in Indonesia and Brazil invited a private fund, "&Green" to catalyse their deforestation-free commodity chain private investments at the local level. "&Green" is a fund established by the IDH Sustainable Trade Initiative, with Norway's International Climate and Forest Initiative (NICFI) as the anchor investor, and Unilever Group and the GEF as contributors. The &Green fund provides credits and guarantees to private entities for commercial agricultural projects to protect and restore tropical forests and peatlands, with strong local governmental commitment. In 2019 and 2020, the fund supported such projects in Indonesia and Brazil for sustainable palm, soy, cattle, and rubber. The fund itself invests in private-private investments but explicitly prioritizes agribusinesses where there is strong subnational government commitment to reduce deforestation and actively engage with the private sector, communities, and civil society to protect tropical forests, and states this clearly in its investment criteria. Both Indonesia and Brazil have implemented a range of decentralization measures to empower subnational and local governments. In the case of Indonesia's forestry sector, the government endorsed the 2014 Local Government Law to enable the central and provincial governments to share responsibility for the forest inventory, forest management, and issuance of forest business permits. Such governmental initiatives welcomed the private sector investment by &Green to invest in sustainable agricultural business models that reduce deforestation and leverage private sector investment. Jurisdictional governments in Indonesia and Brazil actively engaged with the fund to develop their deforestation-free commodity chain at the subnational level, which the funder believed to be more likely to implement and enforce environmental policies and actions.

Source: Antlöv, H., Wetterberg, A. & Dharmawan, L. 2016. *Village Governance, Community Life, and the 2014 Village Law in Indonesia*. Bulletin of Indonesian Economic Studies, 52(2): 161–183.; **Naylor, R.L., Higgins, M.M., Edwards, R.B. *et al.*** 2019. *Decentralization and the environment: Assessing smallholder oil palm development in Indonesia.* Ambio, 48: 1195–1208.

2.4.5 Integrate forest considerations across investment plans

Political will and adequate financial resources are crucial in the development of a shared theory of change or common agenda. Strong public commitments can signal to the international community and private sector stakeholders that fiscal reform is on the agenda, thereby fostering an environment for sustainable business development while mitigating deforestation and forest degradation (Furumo and Lambin, 2020; World Bank, 2021).

Deforestation and forest degradation can pose numerous financial risks, from global to regional, and national and local levels. These risks span from the consequences of diminishing regulating services provided by forests, such as climate mitigation and water regulation, to lessened capacities for climate adaptation and ecosystem and livelihood resilience, the loss of green jobs for more than 86 million people and greater likelihoods of epidemics and pandemics caused by zoonotic disease and loss of biodiversity and healthy ecosystems (FAO and UNEP, 2020). Despite their major contributions to social and economic well-being, forests are often considered only in sector-oriented investment strategies, and oftentimes excluded from consideration in national fiscal reforms.

Investment planning for key sectors and interventions can enable the identification of potential investment opportunities and needs for for public investment in public goods and services to underpin an enabling environment fostering more innovative finance. An investment plan is often developed initially at the national level, while at the subnational level this should include a roadmap for private sector investment and potentially de-risking loans. Subsidies and incentives could be directed to support its implementation and, in the process, achieve coherence, with additional funding through government-led REDD+ projects or other sources of funding (Meyer and Miller,

2015). Within an investment plan, existing and/or innovative frameworks can be applied to redesign the financial landscape, and suitable financial mechanisms identified for development. One emerging opportunity for enhancing forest considerations is the increasing development of climate smart agriculture investment plans in countries such as Bangladesh, Côte d'Ivoire, Mali, Nepal and Zambia. Forests can be explicitly integrated into such plans and in turn integrated into broader sectoral agricultural investment plans.

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Final considerations: from commitments to actions

3

In September 2022, unprecedented flooding in Pakistan submerged a third of the country underwater, capturing the world's attention, including that of the UN Secretary General, António Guterres, who was quoted saying: "I have seen many humanitarian disasters in the world, but I have never seen climate carnage on this scale." Increasing frequency of droughts, forest fires and extreme climate events serve as glaring indicators of the urgency for global development models to undergo major shifts.

The capacity of forests to mitigate climate change and increase resilience to the consequences associated with a warming world will be critical if governments are to meet the challenges posed by climate change. Despite progress, deforestation and forest degradation continue to affect millions of ha year over year. The largest share of this loss results from agricultural land expansion, driven by global patterns of production, transformation, trade, and consumption of food. Therefore, systemic transformation of agrifood systems is among the leading solutions identified to address deforestation.

Halting deforestation without restricting progress towards other Sustainable Development Goals, such as ending hunger and reducing poverty, requires policy coherence and effective governance. No single instrument, nor single actor, can make significant progress in halting deforestation on their own; on the contrary, a concerted and collective response is required to effect global change. Through actions across multiple areas, governments can lead the transformation of agrifood systems necessary to control forest loss and boost synergies between agriculture and forests while tackling climate change and contributing to economic development.

Public action should scale up multiple initiatives and pilot projects already under implementation, whether the main objective is agricultural innovation, REDD+ or climate change, food security and nutrition, or conservation. Governments can deconstruct longstanding silos across forestry and other sectors, including agriculture, and foster an environment that coalesces their various mandates, such as policymaking, legal frameworks, law enforcement, fiscal instruments, public expenditure, technical assistance, and education. Further articulation between initiatives focused on value chains and integrated land use planning could catalyse the respective impacts of these two types of approaches. Better alignment of public and private action would be instrumental in achieving investment levels consistent with the dramatic change needed in production models, market relationships, land tenure and land use patterns. Innovative finance must be developed to create revenues associated with forests that reflect their unique values and provide benefits to local communities committed to halting deforestation. Strong and effective stakeholder engagement with Indigenous Peoples, local communities, women, and youth is pivotal to this success.

Global momentum for achieving these objectives is strong and the many tools in place are a testament to the potential for solution-oriented action. Such opportunities must be seized to turn commitments into real impacts at scale.

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Food and Agriculture Organization of the United Nations
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ISBN 978-92-5-136949-4

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CC2262EN/1/09.22